TV SOUND MULTIPLEX MODULATOR

VP-7681B

SERVICE MANUAL

MANUAL PART NUMBER
sEP7681B-0

TV SOUND MULTIPLEX MODULATOR

VP-7681B

SERVICE MANUAL

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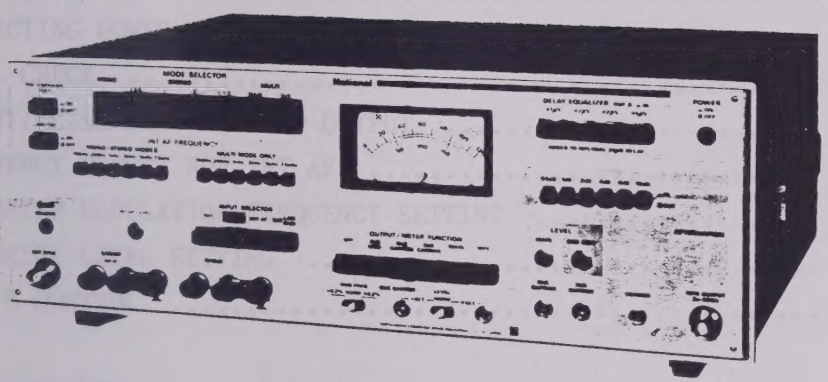
MODE SELECTOR
STEREO
MULTI
Matsushita
DELAY EQUALIZER
POWER
INT AF FREQUENCY
STEREO MODE ONLY
MULTI MODE ONLY
INPUT SELECTOR
OUTPUT / METER FUNCTION
LEVEL

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I. PRECAUTIONS

1-1 MODULATION POLARITY

Since an FM-FM method is adopted in the TV sound multiplex broadcasting system, disaccordance in modulation polarities of frequency modulation (FM) circuits provided in a modulator or RF signal generator causes polarity inversion in the main channel. This leads to inversion of L (left) and R (right) channels during stereo operation.

The polarity of frequency deviation of the instrument's sub carrier is: FM deviation on the plus (+) side is caused by the modulation signal with positive (+) polarity.

Make sure to use an RF signal generator which causes plus (+) FM deviation by a modulation signal with positive (+) polarity.

The same holds true on the receiver side when frequency conversion circuit and subchannel demodulation circuit are set to have reverse polarities. Verify the overall system has the same polarity relationship.

1-2 OUTPUT ATTENUATOR

Using an attenuator for a multiplex signal output changes the main channel output, but it does not change frequency deviation in the subchannel signal since the modulator adopts the FM-FM method. Note that the change of attenuation affects the stereo separation.

Applying the output to an RF signal generator requires particular consideration so as to have rated frequency deviation (MAIN $\pm$25 kHz, SUB $\pm$20 kHz for stereo and $\pm$15 kHz for multi-sound, Q $\pm$2 kHz). Otherwise, separation and distortion may get worse. The cumulative step attenuator of the modulator should only be used to compensate the modulation sensitivity of the RF signal generator to be used.

Make sure not to change the attenuator and semi-fixed VERNIER control after completion of the level setting.

1-3 EXTERNAL INPUT LEVEL

When using external input terminals (L/MAIN, R/SUB), set the input level to have the maximum of:

1 Vrms ---------- Normal

-16 dBV ($\fallingdotseq$ 160 mVrms) ----- With pre-emphasis

For the optional limiter amplifier (VQ-072B) operation, set the level normally at -26 dBV ($\fallingdotseq$ 50 mVrms) and limited range will be approximately from -20 to -6 dBV ($\fallingdotseq$ 100 mVrms to 0.5 Vrms).

1-4 Q SIGNAL TIME COMPENSATION

A certain time lag after the disconnection of Q signal is required before the sound multiplex broadcasting is switched to monophonic. This is to prevent transient influence on the receiver side. The VP-7681B has such time compensation capability as follows:

Approximately 0.8 seconds compensation time is provided after the Q signal is disconnected. See Fig. 1.

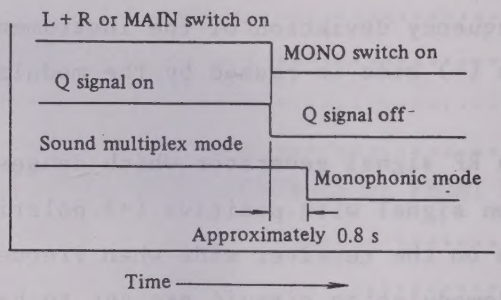


Fig. 1 Timing chart for switching from sound multiplex broadcasting to monophonic

II. GENERAL

2-1 TV SOUND MULTIPLEX BROADCASTING SYSTEM

Television broadcasting adopts FM-FM method for sound multiplex system which broadcasts multi-sound (ex. bilingual broadcasting) or stereophonic sound. The method modulates TV sound carrier with a subcarrier whose frequency is modulated so as to be compatible with the existing monophonic broadcasting system. Given in Fig. 2 is the frequency spectrum of the method.

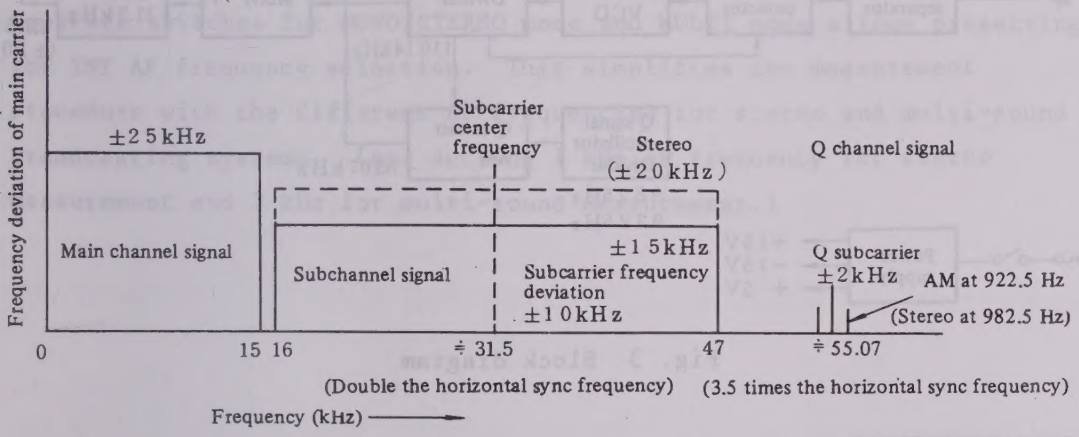


Fig. 2 Frequency spectrum of the TV sound multiplex signal

The major terms are explained below:

(1) Main channel signal: Main sound signal in the multi-sound broadcasting, or the signal obtained by adding the left and right signals in the stereophonic broadcasting

(2) Subchannel signal: Subsound signal in the multi-sound broadcasting, or the signal obtained by modulating the frequency of the sound subcarrier (≒ 31.5 kHz) with the difference signal of the right and left signals in the stereophonic broadcasting

(3) Q signal: Signal inserted to determine on the receiver side whether the broadcasting is being performed by the TV sound multiplex method, and whether it is multi-sound broadcasting or stereophonic broadcasting.

2-2 MODULATOR CONFIGURATION

The VP-7681B is a modulator for generating TV sound multiplex signals. Fig. 3 shows the block diagram of major internal circuits.

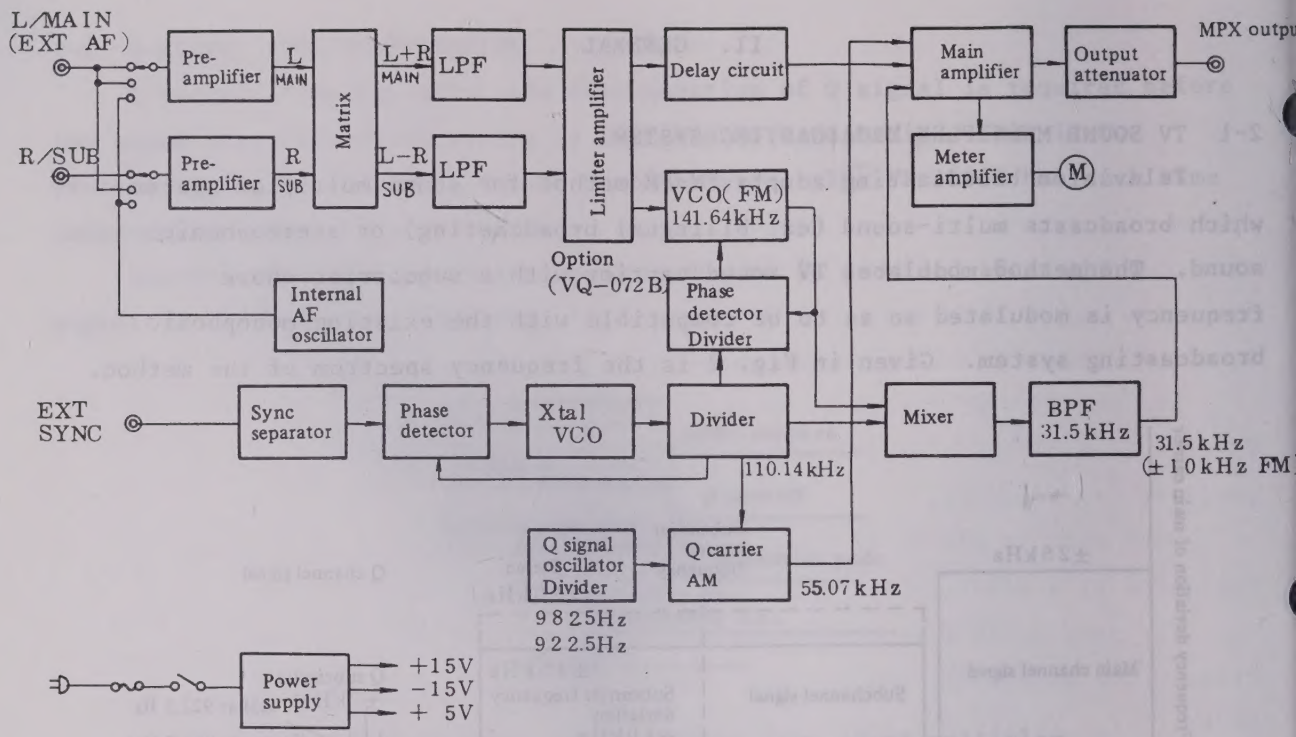


Fig. 3 Block diagram

2-3 CHARACTERISTICS

1) The VP-7681B is a modulator for obtaining signals for TV stereo and multi-sound measurements.

2) It provides MONO, STEREO (L+R, L, R, L-R), and MULTI (MAIN, SUB) mode signals. A desired mode is selected with the remotely-controllable MODE SELECTOR switch.

3) Interlocked with the MODE SELECTOR switch, level switching between stereo and multi-sound for subcarrier, and selection between 982.5 Hz (stereo) and 922.5 Hz (multi-sound) of the Q signal are automatically done to provide rated output.

4) The subcarrier level of the Q signal can be set at a rated level, +SET (100 to 150%), and -SET (50 to 100%) with the switch and level control on the front panel.
The 922.5 Hz and 982.5 Hz signals can be set at a frequency of rated value or $\pm$0.2% with the switch on the front panel.

5) Subcarrier and Q carrier are divided from an internal crystal oscillator to provide accurate frequencies. When an external sync signal is applied, the crystal oscillator is phase-locked and both the subcarrier and Q signals are synchronized with the external signal. If the external signal has unacceptable frequency drift and polarity, the UNLOCK light turns on to warn.

6) The optional limiter amplifier VQ-072B provides the limiter function similar to the broadcasting station.

7) The modulator internally has a 20 μs receiver delay compensation function. The compensation can be increased up to 10 μs in 1 μs steps if required.

8) The output circuit has a resistance attenuator of up to 23.5 dB in 0.5 steps and a vernier continuously variable between the steps. (See paragraph 1-2 for MPX operation). The furnished attenuator is a 75 Ω type. An optional 600 Ω attenuator is also available to be installed.

9) Separate switches for MONO/STEREO mode and MULTI mode allows presetting for INT AF frequency selection. This simplifies the measurement procedure with the different AF frequencies for stereo and multi-sound broadcasting systems. (ex. setting 1 kHz AF frequency for stereo measurement and 3 kHz for multi-sound measurement.)

III. OPERATION

3-1 FRONT PANEL

See attached Fig. 1 Front panel at the end of this manual for locating terminals and controls explained below.

(1) EXT SYNC — For externally synchronizing the subcarrier. Composite video signal (1 Vp-p, sync negative) or horizontal sync signal (1 Vp-p) is applied.

(2) SYNC UNLOCK — A red LED turns on to inform of unstable operation. Check the external signal when the light is turned on.

(3) LIMITER — Turning this switch on causes limiting if the optional limiter amplifier VQ-072B is installed and required cable connection is made.

(4) PRE-EMPHASIS (75 μs) — ON/OFF switch for 75 μs pre-emphasis.

(5) MODE SELECTOR — Selects MONO, STEREO (L+R, L, R, L-R), or MULTI (MAIN, SUB) mode for MPX output.

> Note: When setting EXT $\frac{L(M)}{R(S)}$ for INPUT SELECTOR, select:
>
> L + R for STEREO mode
>
> MAIN for MULTI mode
>
> MONO for MONOPHONIC mode.

(6) Indicator — Indicates the output level selected with OUTPUT/METER FUNCTION switch.
Q carrier level can be read on the inner 50 to 150% Q-C scale.
Note the indicated value of the output voltage differs from the absolute value when MPX is selected on switch ⑳ .

(7) DELAY EQUALIZER — Used for increasing the receiver delay time compensation over the fixed 20 μs. Four cumulative switches, 1, 2, 2 and 5 μs, provide 10 μs delay in 1 μs steps.

(8) POWER ▬ ON ▮ OFF — Turns on and off the mains power.

(9) ATTENUATION — Output attenuator for attenuating output up to 23.5 dB in 0.5 dB steps. Six switches, 0.5, 1, 2, 4, 6, and 10 dB provide 23.5 dB in 0.5 dB steps.

(10) VERNIER — Used for fine adjustment between the steps of the attenuator.

(11) MPX OUTPUT — BNC output connector for multiplex output with an impedance of 75 Ω. (An optional 600 Ω output is also available.)

(12) SUB MOD — Adjusts frequency deviation of the subchannel. Select SUB MOD of OUTPUT/METER (20) and set the indicator to 100% (S-MOD). This causes ±10 kHz FM deviation on the subcarrier.

(13) SUB CARRIER — Adjusts subcarrier level. To obtain the rated level, select SUB CARRIER for OUTPUT/METER FUNCTION (20), select for MODE SELECTOR (5) one out of L + R, L, R, and L - R of STEREO modes, and then set the indicator at 80% (SC-S). The rated level is 0.08 Vp-p across 75 Ω load.

If MAIN or SUB of the MULTI mode is selected for MODE SELECTOR (5), 60% will be obtained.

(14) Q CARRIER — Adjusts Q signal level. To obtain the rated level, select Q CARRIER for OUTPUT/METER FUNCTION (20), and NORM for QUE CARRIER LEVEL (18), and then set the indicator at 100%. The rated level is 0.08 Vp-p across 75 Ω load.

> Note: This control is invalid when +SET or -SET is selected instead of NORM for QUE CARRIER LEVEL (18).

(15) MAIN — Adjust level of the main channel. To obtain the rated level, select MAIN for OUTPUT/METER FUNCTION (20), and set the indicator at 100% (MAIN). The rated level is 1.0 Vp-p across 75 Ω load.

(16) QUE CARRIER LEVEL +SET — Sets the Q CARRIER level on the plus (+) side (approximately 100 to 150%) of the rated level. Select Q CARRIER for OUTPUT/METER FUNCTION (20), and +SET for QUE CARRIER level (18), and then adjust the level as watching the indicator. (See paragraph 3-7.)

(17) QUE CARRIER LEVEL -SET — Sets the Q CARRIER level on the -side (approximately 50 to 100%) of the rated level. Select Q CARRIER for OUTPUT/METER FUNCTION ⑳ , and -SET for QUE CARRIER LEVEL ⑱ , and then adjust the level as watching the indicator. (See paragraph 3-7.)

(18) QUE CARRIER LEVEL — Selects +SET, NORM, or -SET for the Q CARRIER level. (See paragraph 3-7.)

(19) QUE CARRIER MOD FREQ — Sets the 922.5 Hz (multi-sound) and 982.5 Hz (stereo) frequencies for modulating Q carrier at the rated value, +0.2%, or -0.2%. (See paragraph 3-6.)

(20) OUTPUT/METER FUNCTION — Selects output and meter indication. Refer to Table 3 for the relationship between output signal and indication on the meter selected with this switch and MODE SELECTOR ⑤.

(21) R/SUB — R (right) or SUB terminal for external input. Balanced or unbalanced input can be selected with a shorting bar. (See Fig. 4.)

(22) L/MAIN, EXT AF — L (left) or MAIN terminal for external input, and terminal for EXT AF input. Balanced or unbalanced input can be selected with a shorting bar. (See Fig. 4.)

(23) INPUT SELECTOR — Selects the input mode out of INT AF, EXT AF, EXT $\frac{L(M)}{R(S)}$ and OFF. Selecting OFF turns off all the input.

(24) INT AF LEVEL — Adjusts output level of the internal oscillator.

> Note: This control affects the level for MAIN and SUB.

(25) INT AF FREQ MULTI MODE ONLY — The frequency of INT AF selected with this switch is valid when MULTI mode is selected for MODE SELECTOR ⑤. (See paragraph 3-5.)

(26) INT AF FREQ MONO/STEREO MODES — The frequency of INT AF selected with this switch is valid when MONO or STEREO is selected for MODE SELECTOR ⑤. (See paragraph 3-5.)

3-2 CONNECTING POWER

Plug the power cord into the power outlet and turn the power switch on. This turns on the LED of one of the switches of MODE SELECTOR ⑤ and starts the operation.

3-3 LEVEL CHECK

3-3-1 Checking level with INT AF

After checking level following the procedure given in Table 1, select MPX of OUTPUT/METER FUNCTION (20). Then the MAIN, SUB and Q signals are calibrated for the ratio that will cause the rated frequency deviation of the main carrier.

Table 1. Level checking procedure

Switch setting / Item	(23) INPUT SELECTOR	(25) (26) INT AF FREQ	(5) MODE SELECTOR	(20) OUTPUT /METER FUNCTION	Check and adjustment
MAIN level	INT AF	1 kHz	L+R	MAIN	Check the indicator reads 100% (MAIN) (MPX OUTPUT: 1 Vp-p across 75 Ω load). If the indicator does not read 100%, adjust with MAIN control (15).
SUB CARRIER level	INT AF	1 kHz	L+R	SUB CARRIER	Check the indicator reads 80% (SC-S) (MPX OUTPUT: 0.8 Vp-p across 75 Ω load). If the indicator does not read 80%, adjust with SUB CARRIER control (13).
Q CARRIER level	INT AF	1 kHz	L+R	Q CARRIER	Check the indicator reads 100% (inner Q-C scale) (MPX OUTPUT: 0.08 Vp-p across 75 Ω load). If the indicator does not read 100%, adjust with Q CARRIER control (14).
SUB MOD level	INT AF	1 kHz	L-R	SUB MOD	Check the indicator reads 100% (S-MOD) (SUB frequency deviation: ±10 kHz). If the indicator does not read 100%, adjust with SUB MOD control (12)).

Note: Outputs across 600 Ω load are:

MAIN	2.5 Vp-p
SUB CARRIER	2 Vp-p
Q CARRIER	0.2 Vp-p

3-3-2 Checking level with EXT AF

Change only INPUT SELECTOR switch (23) from INT AF to EXT AF for MAIN level setting. Connect an external AF oscillator to the input terminal of L/MAIN, EXT AF and adjust the input so that the indicator reads 100% (MAIN) (1 Vrms input for 100%). Now the level setting for Table 1 has been completed and is ready for level checking as explained in 3-3-1. Refer to 3-3-3 for balanced and unbalanced input.

3-3-3 Applying balanced and unbalanced input.

The external input terminal accepts either balanced (input impedance of 40 kΩ) or unbalanced (input impedance of 20 kΩ) input with or without the shorting bar. See Fig. 4 to set the desired input mode.

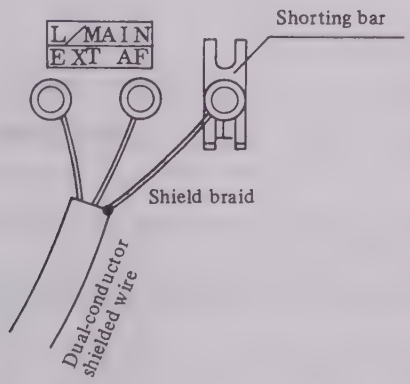


Fig. 4-a Balanced input

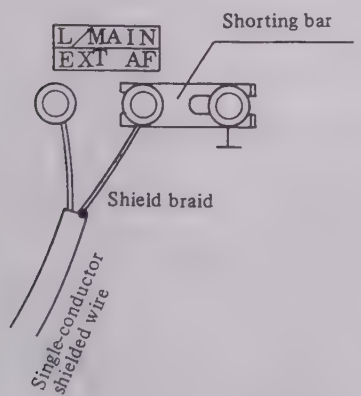


Fig. 4-b Unbalanced input

3-3-4 EXT $\frac{L(M)}{R(S)}$ operation

(1) Apply input signals to L/MAIN and R/SUB input terminals. (See paragraph 3-3-3.)

(2) Set INPUT SELECTOR ㉓ to EXT $\frac{L(M)}{R(S)}$.

(3) Set MODE SELECTOR ⑤ to L+R for stereo, and MAIN for dual sound.

(4) To use limiter amplifier VQ-072B, turn LIMITER ③ on.

(5) To operate with pre-emphasis, turn PRE EMPHASIS 75 μs ④ on. When the limiter is turned off and pre-emphasis alone is turned on, adjust the input to 160 mVrms or less (-16 dBV).

(6) When both the limiter and pre-emphasis are turned off, set the input to 1 Vrms or less.

(7) Set OUTPUT/METER FUNCTION ⑳ to MPX.

3-4 OUTPUT/METER FUNCTION AND OUTPUT

Table 2 shows the composition of MPX OUTPUT, when OUTPUT/METER FUNCTION ⑳ is set to MPX and 1 Vrms is applied for each input.

Table 2 MPX output composition when OUTPUT/METER FUNCTION is set to MPX

㉓ INPUT SELECTOR	External input		⑤ MODE SELECTOR		MAIN output level	SUB		QUE	
						Sub-carrier output level	FM deviation (modulation factor)	Output level	Modulation frequency (Modulation factor)
INT AF or EXT AF	Rated external input of 1 Vrms is applied when EXT AF is selected		MONO		1 Vp-p (±25 kHz)	0	0	0	0
			Stereo	L+R	1 Vp-p (±25 kHz)	0.8 Vp-p (±20 kHz)	0	0.08 Vp-p (±2 kHz)	982.5 Hz 60%
				L	0.5 Vp-p (±12.5 kHz)	0.8 Vp-p (±20 kHz)	±5 kHz (50%)	0.08 Vp-p (±2 kHz)	982.5 Hz 60%
				R	0.5 Vp-p (±12.5 kHz)	0.8 Vp-p (±20 kHz)	±5 kHz (50%)	0.08 Vp-p (±2 kHz)	982.5 Hz 60%
				L-R	0	0.8 Vp-p (±20 kHz)	±10 kHz (100%)	0.08 Vp-p (±2 kHz)	982.5 Hz 60%
			Multi-sound	MAIN	1 Vp-p (±25 kHz)	0.6 Vp-p (±15 kHz)	0	0.08 Vp-p (±2 kHz)	922.5 Hz 60%
				SUB	0	0.6 Vp-p (±15 kHz)	±10 kHz (100%)	0.08 Vp-p (±2 kHz)	922.5 Hz 60%
EXT $\frac{L(M)}{R(S)}$	Monophonic		MONO		1 Vp-p (±25 kHz)	0	0	0	0
	Stereo	L and R inputs (L+R)	L+R		1 Vp-p (±25 kHz)	0.8 Vp-p (±20 kHz)	0	0.08 Vp-p (±2 kHz)	982.5 Hz 60%
		L input only (L)			0.5 Vp-p (±12.5 kHz)	0.8 Vp-p (±20 kHz)	±5 kHz (50%)	0.08 Vp-p (±2 kHz)	982.5 Hz 60%
		R input only (R)			0.5 Vp-p (±12.5 kHz)	0.8 Vp-p (±20 kHz)	±5 kHz (50%)	0.08 Vp-p (±2 kHz)	982.5 Hz 60%

Table 2 - continued

㉓ INPUT SELECTOR	External input		⑤ MODE SELECTOR	MAIN output level	SUB		QUE	
					Sub-carrier output level	FM deviation (modulation factor)	Output level	Modulation frequency (Modulation factor)
EXT L(M) R(S)	Stereo	L and R inputs (L-R)	L+R	0	0.8 Vp-p (±20 kHz)	±10 kHz (100%)	0.08 Vp-p (±2 kHz)	982.5 Hz 60%
	Multi-sound	MAIN	MAIN	1 Vp-p (±25 kHz)	0.6 Vp-p (±15 kHz)	0	0.08 Vp-p (±2 kHz)	922.5 Hz 60%
		SUB		0	0.6 Vp-p (±15 kHz)	±10 kHz (100%)	0.08 Vp-p (±2 kHz)	922.5 Hz 60%
		MAIN SUB		1 Vp-p (±25 kHz)	0.6 Vp-p (±15 kHz)	±10 kHz (100%)	0.08 Vp-p (±2 kHz)	922.5 Hz 60%
OFF	-		-	0	0	0	0	0

Values in parenthese show the frequency deviation of the main carrier.

Output level is the MPX output voltage across 75 Ω load after the specified level adjustment is completed. (ATT: 0 dB, VERNIER: CAL).

Table 3 MPX output composition obtained by the combination of MODE SELECTOR and OUTPUT/METER FUNCTION switches

⑤ MODE SELECTOR \ ⑳ OUTPUT/METER FUNCTION		MPX	MAIN	SUB CARRIER	QUE CARRIER	SUB MOD	OFF
MONO			1 kHz 1 Vp-p	0	0	0	0
Stereo	L+R		1 kHz 1 Vp-p	Sub-carrier only 0.8 Vp-p	Q signal modulated with 982.5 Hz 0.08 Vp-p	Subcarrier 0.8 Vp-p FM deviation 0	0
	L		1 kHz 0.5 Vp-p	Sub-carrier only 0.8 Vp-p	Q signal modulated with 982.5 Hz 0.08 Vp-p	Subcarrier 0.8 Vp-p FM deviation ±5 kHz	0
	R		1 kHz 0.5 Vp-p	Sub-carrier only 0.8 Vp-p	Q signal modulated with 982.5 Hz 0.08 Vp-p	Subcarrier 0.8 Vp-p FM deviation ±5 kHz	0

Table 3 - continued

⑳ OUTPUT/METER FUNCTION / ⑤ MODE SELECTOR		MPX	MAIN	SUB CARRIER	QUE CARRIER	SUB MOD	OFF
Stereo	L-R		0	Sub-carrier only 0.8 Vp-p	Q signal modulated with 982.5 Hz 0.08 Vp-p	Subcarrier 0.8 Vp-p FM deviation ±10 kHz	0
Multi-sound	MAIN		1 kHz 1 V	Sub-carrier only 0.6 V	Q signal modulated with 922.5 Hz 0.08 Vp-p	Subcarrier 0.6 V FM deviation 0	0
	SUB		0	Sub-carrier only 0.6 V	Q signal modulated with 922.5 Hz 0.08 Vp-p	Subcarrier 0.6 V FM deviation ±10 kHz	0

See Table 2 for this item

Select INT AF for INPUT SELECTOR ㉓ , 1 kHz for INT AF FREQ ㉕ and ㉖ . Output level across 75 Ω load.

Note: Output levels given in Table 2 and Table 3 are the values across 75 Ω load. For optional 600 Ω output system, use Table 4 for conversion.

Table 4 Output conversion between 600 Ω and 75 Ω

	600 Ω termination	75 Ω termination
MONO, L+R	2.5 Vp-p	1 Vp-p
MONO, L+R	1.25 Vp-p	0.5 Vp-p
Subcarrier level (Stereo)	2 Vp-p	0.8 Vp-p
Subcarrier level (Multi-sound)	1.5 Vp-p	0.6 Vp-p
Q carrier level	0.2 Vp-p	0.08 Vp-p

3-5 FREQUENCY PRESET FOR INT AF

Presetting for INT AF FREQ ㉕ and ㉖ saves the user from switching between different AF frequencies during measurement. If, for example, measurement is made at 1 kHz for stereo and 3 kHz for multi-sound, set 1 kHz with INT AF FREQ ㉖ , and 3 kHz with INT AF FREQ ㉕ . Then pressing L (STEREO) of MODE SELECTOR ⑤ activates 1 kHz oscillation, while pressing MAIN (MULTI) activates 3 kHz oscillation.

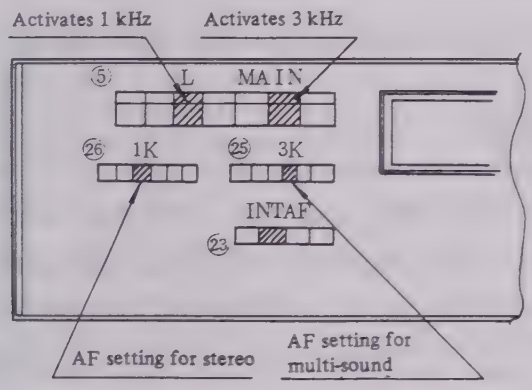


Fig. 5 Frequency presetting for INT AF

3-6 Q CARRIER MODULATION FREQUENCY SETTING

See Fig. 6 for switch setting. The rated value of frequency for modulating Q carrier with QUE CARRIER MOD FREQ ⑲ can be changed by approximately ±0.2% as shown in Table 5. The Q frequencies obtained by dividing crystal-controlled frequency provides high accuracy at any point. It is applicable to checking control signal selecting filter or frequency limit of the related circuit.

Table 5 Q signal frequencies

MOD FREQ	-0.2%	NORM	+0.2%	Note
Stereo	980.585 Hz (-0.195%)	982.5 Hz	984.423 Hz (+0.196%)	L+R, L, R, or L-R is selected for MODE SELECTOR ⑤.
Multi-sound	920.70 Hz (-0.195%)	922.5 Hz	924.305 Hz (+0.196%)	MAIN or SUB is selected for MODE SELECTOR ⑤.

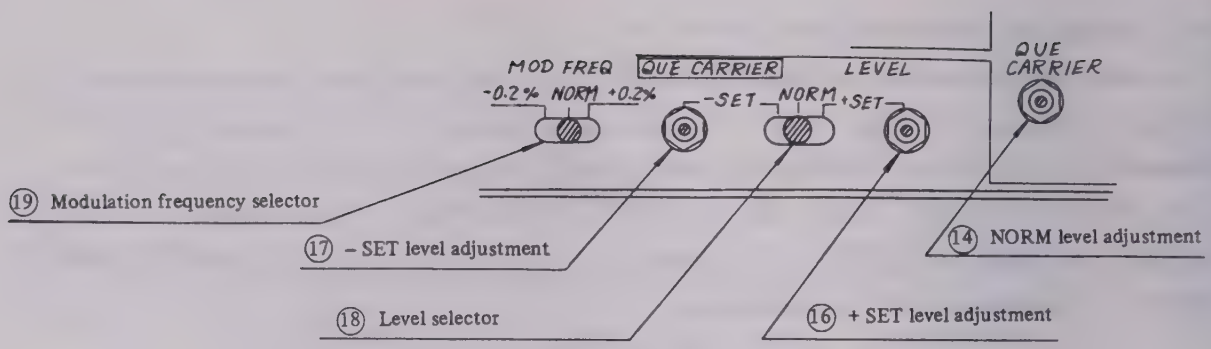


Fig. 6 Selecting Q carrier level and modulation frequency

3-7 Q CARRIER LEVEL SETTING

See Fig. 6 for switch setting.

Select one out of -SET, NORM, and +SET with QUE CARRIER LEVEL switch ⑱ which has been preset with adjustments ⑭ , ⑯ , and ⑰ . This function used together with Q carrier modulation frequency discussed in paragraph 3-6 is helpful for testing control signal selecting filter and the related circuit.

Use the Q-C scale of the indicator and set the level referring to the table below.

Switch ⑱	Setting range	Adjustment
+SET	Approximately 100 to 150% for upper limit	⑯
NORM	100% (0.08 Vp-p across 75 Ω load)	⑭
-SET	Approximately 50 to 100% for lower limit	⑰

3-8 REMOTE CONTROL

The functions of MODE SELECTOR ⑤ switches on the front panel can be controlled remotely by using the 24-pin connector and REMOTE/MANUAL switch on the rear panel.

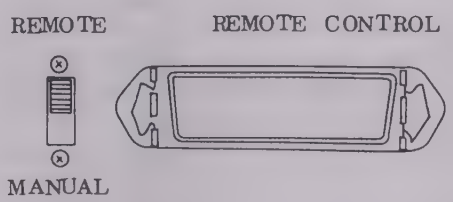


Fig. 7 Remote control connector and REMOTE/MANUAL switch

Shown below is the control logic convention.

Logic "1" 0 to +0.5 V or short-circuit

Logic "0" +2.5 V to +25 V or open-circuit

The list below shows connector pin connections.

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12
Connection	COM-MON	-	GND	-	MONO	-	L	-	L-R	-	-	-
Pin No.	13	14	15	16	17	18	19	20	21	22	23	24
Connection	-	L+R	-	R	-	MAIN	-	SUB	-	-	-	-

Example setting with external switches:

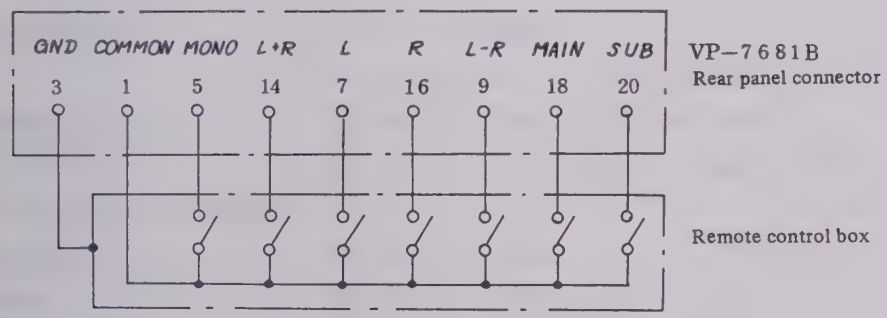


Fig. 8 Remote control

IV. SPECIFICATIONS

4-1 EXTERNAL INPUT CHARACTERISTICS

(1) L/MAIN (EXT AF), R/SUB

Input impedance	40 kΩ, balanced
	20 kΩ, unbalanced
Input frequency range	50 Hz to 15 kHz
Input level required	1 Vrms
for rated output	With pre-emphasis: 160 mVrms
	With limiter (VQ-072B, option): 1 Vrms

(2) Sync input

Input impedance	10 kΩ, unbalanced
Input level	0.3 Vp-p

4-2 OUTPUT CHARACTERISTICS

(1) Output impedance	75 Ω, unbalanced
	(Option: 600 Ω, unbalanced)
(2) Attenuator	0.5 to 23.5 dB in 0.5 dB steps
	(0.5, 1, 2, 4, 6 10 dB, cumulated)

(3) Output signals and frequency

Main channel	50 Hz to 15 kHz
Subchannel	16.5 kHz to 46.5 kHz
Q channel	55.07 kHz (Q signal: 60% AM)

(4) Output level across rated load (External input: 1 Vrms, Attenuator: 0 dB)

	Standard 75 Ω	Optional 600 Ω
Main channel	1.0 Vp-p	2.5 Vp-p
Subchannel Stereo	0.8 Vp-p	2.0 Vp-p
Multi-sound	0.6 Vp-p	1.5 Vp-p
Q channel	0.08 Vp-p	0.2 Vp-p

(5) Frequency response (with reference to 1 kHz)

Main channel	Within ±0.5 dB, 50 Hz to 10 kHz
	Within ±1.5 dB, up to 15 kHz
Subchannel	Within ±0.5 dB, 50 Hz to 7.5 kHz
	Within ±2 dB, up to 12.5 kHz

(6) S/N (at 1 kHz, rated output level)

Main channel	≥70 dB
Subchannel	≥65 dB

(7)	Distortion (at rated output level)	
	Main channel	≤0.2%, 50 Hz to 15 kHz
	Subchannel	≤0.5%, 50 Hz to 1 kHz
		≤(Mod. freq. value in kHz)%, 1 kHz to 10 kHz
(8)	Crosstalk	
	Subchannel to main channel	≥65 dB, 50 Hz to 1 kHz
		≥50 dB, up to 5 kHz
	Main channel to subchannel	≥60 dB, 50 Hz to 1 kHz
		≥40 dB, up to 5 kHz
(9)	Separation	
		≥40 dB, 50 Hz to 4 kHz
		≥20 dB, up to 12.5 kHz
(10)	Pre-emphasis	
	Main and Subchannel	75 μs
(11)	Main channel delay compensation	
	Internally fixed	20 μs
	Variable	Additional 1 to 10 μs in 1 μs steps (1, 2, 2, 5 μs, cumulated)

4-3 SUBCARRIER

(1)	Internal sync frequency	31.468 kHz (Double the TV horizontal sync freq.)
(2)	External sync	
	Signal source	TV composite video signal or TV sync signal
	Sync frequency accuracy required	0.01%
(3)	FM deviation	±10 kHz at rated input level with SUB selection in MULTI (multi-sound) mode.

4-4 Q CHANNEL

(1)	Q subcarrier frequency	55.03 kHz (3.5 times the TV horizontal sync freq.)
(2)	Q subcarrier level variable range	Within ±50% of rated level
(3)	Q signals	
	Multi-sound	922.5 Hz sine wave
	Stereo	982.5 Hz sine wave
(4)	Q signal frequency selection	±0.2% of rated frequency shown in (3) above
(5)	Q subcarrier modulation	60% AM by Q signal

(6)	Mode switching time compensation	About 0.8 seconds delay is provided for changing from multiplex to monophonic mode after Q signal switching.

4-5 INTERNAL AF OSCILLATOR

(1)	Frequencies	100, 200 Hz, 1, 3, 5, 7.5 kHz
(2)	Output level	Adjustable to obtain rated output level for main and subchannel
(3)	Frequency selection	Separately selectable for MONO/STEREO and MULTI modes

4-6 REMOTE CONTROL

(1)	Function available	Selection of the MODE SELECTOR (MONO, L+R, L, R, L-R, MAIN, SUB)
(2)	Control logic	Logic "1": 0 to +0.5 V or short-circuit Logic "0": +2.5 V to +25 V or open-circuit

4-7 LIMITER CHARACTERISTICS (OPTION, VQ-072B INSTALLED)

(1)	Compression ratio	$\leq$1/5
(2)	Limiting start time	$\leq$50 µs
(3)	Recovery time	0.6 to 1.5 second
(4)	Main channel distortion (input level: 1 V to 5 Vrms)	$\leq$0.2%, 200 Hz to 12.5 kHz

4-8	POWER REQUIREMENTS	100 V nominal (Another voltage upon request) 50-60 Hz, 25 VA or less
4-9	DIMENSIONS AND MASS	430 mm wide, 150 mm high, 350 mm deep excluding knobs, feets and handle Approx. 11 kg
4-10	ACCESSORIES FURNISHED	1 Connector plug (Amphenol 57-30240) 1 Spare fuse (1 A) 1 Instruction manual

V. ADJUSTMENT

5-1 EQUIPMENT REQUIRED

(1) Digital voltmeter	±15 VDC and +5V ranges
(2) Oscilloscope	VP-5503A or VP-5505A (excellent CMRR with ADD function)
(3) RS oscillator	VP-7720B (low distortion)
(4) Distortion meter	VP-7702B (with level measuring function)
(5) AF spectrum analyzer	HP-3580A or equivalent
(6) Frequency counter	Low-frequency counter (5-digit measurement near 1 kHz, range up to 5 MHz)
(7) Phase meter	MPM-551 (Meguro Denpa) or equivalent
(8) Demodulator	TV sound multiplex demodulator (produced in-house)

5-2 POWER SUPPLY VOLTAGE ADJUSTMENT

Conduct the following adjustments without inserting the PCBs connected via connectors.

(1) +15V adjustment

Connect the digital voltmeter to the F terminal. Adjust the +15V control for a meter reading of 15V ±0.1V.

(2) -15V check

Connect the digital voltmeter to the G terminal. Check that the voltage is within -15V ±0.1V.

(3) +5V check

Connect the digital voltmeter to the D terminal. Check that the voltage is within -15V ±0.1V.

5-3 MATRIX OPERATION CHECK

(1) Set the INPUT selector to EXT AF.

(2) Supply an approximately 2Vp-p, 1-kHz sinewave to the L/MAIN and R/SUB terminals.

(3) Install the PREAMP/LPF board, of which operation has been checked.

(4) Connect CH1 and CH2 to pins 5 and 19 of the edge connector, respectively, and display two-event traces.

(5) Set the MODE switch and the OUTPUT/METER FUNCTION on the front panel as follows. Confirm that the output waveforms are as specified in the table below.

	MONO	L+R	L	R	L-R	MAIN	SUB
MPX	2V/0V	2V/0V	1V/1V	1V/-1V	0V/2V	2V/0V	0V/2V
MAIN	2V/0V	2V/0V	1V/0V	1V/0V	0V/0V	2V/0V	0V/0V
S-C	0V/0V	0V/0V	0V/0V	0V/0V	0V/0V	0V/0V	0V/0V
Q-C	0V/0V	0V/0V	0V/0V	0V/0V	0V/0V	0V/0V	0V/0V
S-MOD	0V/0V	0V/0V	0V/1V	0V/1V	0V/2V	0V/0V	0V/2V
OFF	0V/0V	0V/0V	0V/0V	0V/0V	0V/0V	0V/0V	0V/0V

Note: "-1V" means the reverse phase. The INPUT selector is set to EXT AF.

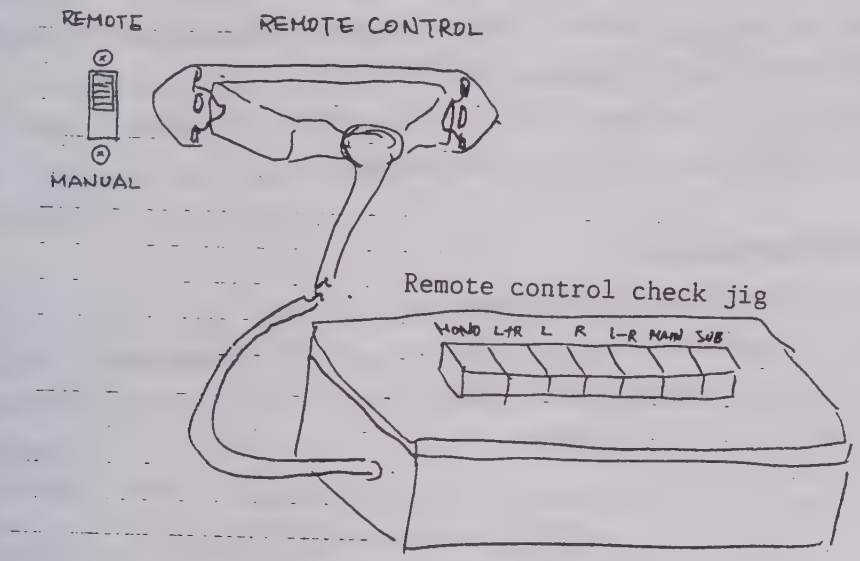
(6) Set the INPUT selector to EXT L/R. Check that the MAIN voltage is as specified in the table below.

	MONO	L+R		MAIN
MPX	2V/0V	2V/0V		2V/2V

5-4 REMOTE CONTROL OPERATION CHECK

(1) Connect the remote control check jig to the REMOTE CONTROL connector on the rear panel.

(2) Set the REMOTE/MANUAL selector on the rear panel to REMOTE.



(3) Confirm that the corresponding LEDs of the MODE selector switches come on as each button on the jig is pressed.

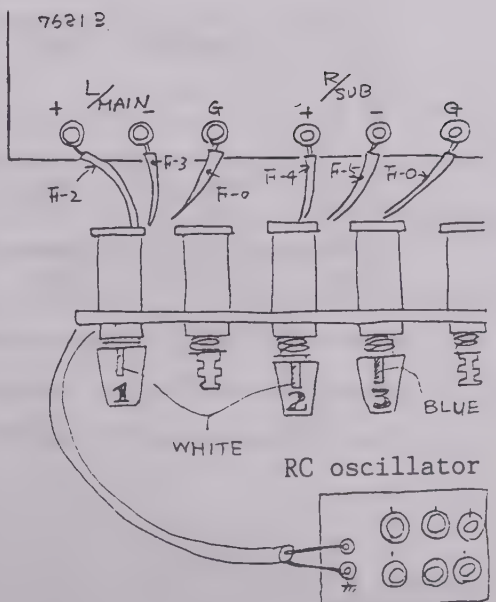
(4) When check is complete, return the REMOTE/MANUAL selector to MANUAL.

5-5 PRE-AMP BOARD

5-5-1 BAL adjustment

o Connect the special jig to the input terminal of the VP-7681B. Remove the terminal short-circuit plate.

L/MAIN + terminal: F-2
- terminal: F-3
G terminal: F-0
R/SUB + terminal: F-4
- terminal: F-5
G terminal: F-0



o Supply a 1-kHz, 2Vp-p signal from the RC oscillator.

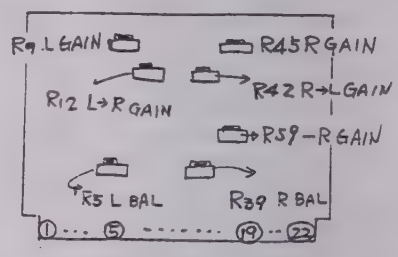
(1) Press switch 2 (L/MAIN and R/SUB signals with same phase are input), but do not press switch 3. Switches 1 and 2 are linked, but switch 3 is independent.

Connect the probe of the oscilloscope to pin 6 of U1. Set the sensitivity to 2 mV/div. Adjust control R5 (L BAL) so that the adjustment signal component is "0".

(2) Operation is the same as (1), but connect the probe to pin 6 of U4 and use control R39 (R BAL) for adjustment.

5-5-2 GAIN adjustment

o Connect CH1 and CH2 of the oscilloscope to connector pins 5 and 19, respectively. Conduct adjustments specified in the table below.



PRE AMP PCB

INPUT selector	MODE	Signal selector	Scope V mode	Adjustment
EXT AF	L	Press SW1. Not SW3.	DUAL	Adjust L GAIN R9 for 1 Vp-p at CH1.
	L	Press SW1. Not SW3.	ADD	Set CH1 and CH2 to 5 mV/div and polarity of CH2 to INV. Adjust R GAIN R45 for "0" output.
	R	Press SW1. Not SW3.	ADD	Set CH1 and CH2 to 5 mV/div and polarity of CH2 to NORM. Adjust -R GAIN R59 for "0" output.
EXT L/R	L-R	Press SW1. Not SW3.	DUAL	Set CH2 to 2 mV/div. Adjust L→R GAIN R12 for "0" output.
	L+R	Press SW1 and SW3.	DUAL	Set CH1 to 2 mV/div. Adjust R→L GAIN R42 for "0" output.

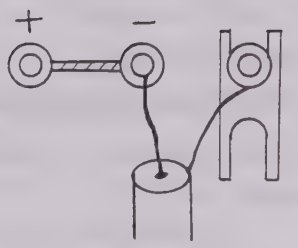
5-6 PREAMP/LPF

5-6-1 BAL adjustment

VP-7681B settings:

INPUT selector: EXT L(M), R(S)

OUTPUT/METER FUNCTION: MPX



RC oscillator

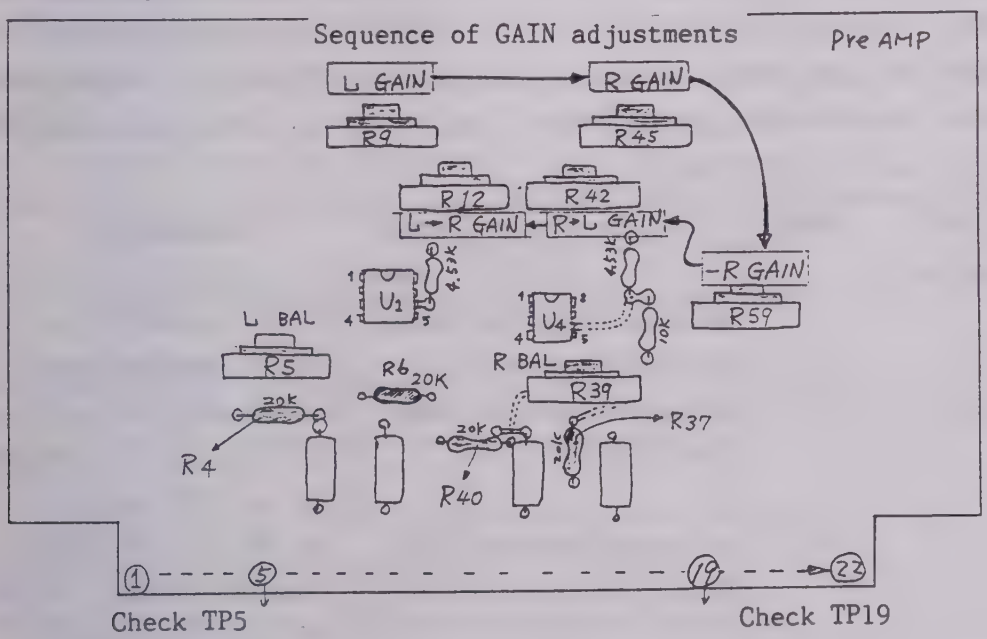
(1) Supply a 2Vp-p, 1-kHz sinewave across the "+", "−" and ground of the L/MAIN terminals.

(2) Connect the oscilloscope probe to pin 6 of U1 and set the sensitivity to 2 mV/div.

(3) Adjust L-BAL control R5 so that the output signal component is "0".

(4) Supply the same signal as (1) to the R/SUB terminal.

(5) Connect the oscilloscope probe to pin 6 of U4. Adjust R-BAL control R39 in the same way as step (3).



- o Turn L-BAL control R5 fully clockwise, adjust the resistance of R4 (20K, 1%) to 2.2 MΩ (ERC14GK) and fix the control using paraffin.
- o Turn L-BAL control R5 fully counterclockwise, adjust the resistance of R6 (20K, 1%) to 2.2 MΩ (ERC14GK) and fix the control using paraffin.
- o Turn R-BAL control R39 fully clockwise, adjust the resistance of R40 (20K, 1%) to 2.2 MΩ (ERC14GK) and fix the control using paraffin.
- o Turn R-BAL control R39 fully counterclockwise, adjust the resistance of R37 (20K, 1%) to 2.2 MΩ (ERC14GK) and fix the control using paraffin.

5-6-2 GAIN adjustment

Set the operation mode of the oscilloscope (VP-5503A or 5505A) to ADD, connect the probe and adjust the oscilloscope for the optimum rejection ratio.

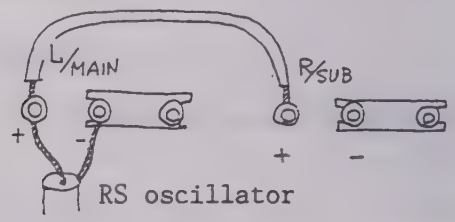
o VP-7681B settings

PRE EMPHASIS: OFF

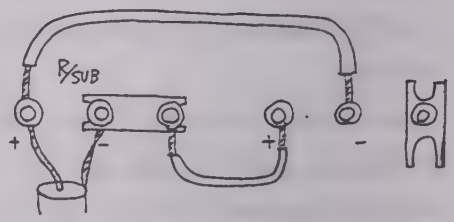
OUTPUT/METER FUNCTION: MPX

Supply identical 1-kHz, 2Vp-p signals to the L and R input terminals.

o Connection



[L/MAIN: Balanced,positive]
[R/SUB: Balanced,positive]



[L/MAIN: Balanced,positive]
[R/SUB: Balanced,negative]

o Connect CH1 and CH2 of the oscilloscope to pins 5 and 19, respectively.

o Conduct the following adjustments, L and R in the EXT AF mode and L+R and L-R in the EXT L/R mode.

INPUT selector	MODE	Signal connected		Scope V mode	Adjustment
		L/MAIN	R/SUB		
EXT AF	L	Balanced Positive	Balanced Positive	DUAL	Adjust L GAIN R9 for 1 Vp-p using CH1 of oscilloscope.
	L	Balanced Positive	Balanced Positive	ADD	Set CH1/CH2 to 5 mV/div and CH2 polarity to INV. Adjust R GAIN R45 for "0" output.
	R	Balanced Positive	Balanced Positive	ADD	Set CH1/CH2 to 5 mV/div and CH2 polarity to INV. Adjust -R GAIN R59 for "0" output.
EXT L(M) R(S)	L+R	Balanced Positive	Balanced Negative	DUAL	Set CH1 to 2 mV/div. Adjust R-L GAIN R42 for "0" output.
	L-R	Balanced Positive	Balanced Positive	DUAL	Set CH2 to 2 mV/div. Adjust L-R GAIN R12 for "0" CH2 output.

Note: Set the OUTPUT 0 control for an almost flat waveform:

When the control is turned → Flat waveform

5-7 AM/SYNC BOARD

5-7-1 Crystal oscillator frequency adjustment

(a) 4.024320 MHz adjustment (Q-CARRIER MOD FREQ: STEREO)

1. Connect the counter to TP1 (pin 1 of U7 SN74LS93N).
2. Set the MODE SELECTOR to STEREO.
3. Set the Q-CARRIER MOD FREQ selector to NORM.
4. Adjust 4.024320-MHz trimmer C1 so that the frequency measured is 4.024320 MHz.

(b) 3.77856 MHz adjustment (Q-CARRIER MOD FREQ: MULTI)

1. Connect the counter to TP1 (pin 1 of U7 SN74LS93N).
2. Set the MODE SELECTOR to MULTI.
3. Set the Q-CARRIER MOD FREQ selector to NORM.
4. Adjust 3.77856-MHz trimmer C4 so that the frequency measured is 3.77856 MHz.

(c) Check of Q-CARRIER,MOD FREQ function

1. Connect the counter to TP2 (pin 6 of U11 µPC151C).
2. Confirm that the following frequencies are obtained at the specified settings.

Q-CARRIER MOD FREQ SW.	MODE SELECTOR	
	STEREO	MULTI
-0.2%	980.585 Hz	920.7 Hz
NORM	982.5 Hz	922.5 Hz
+0.2%	984.423 Hz	924.3 Hz

(d) 3.52448 MHz adjustment (SYNC/Q-CARRIER: 55.07 kHz)

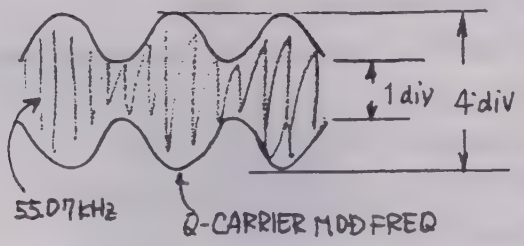
1. Connect the counter to TP3 (pin 14 of U12 SN74LS93N).
2. Open the EXT SYNC INPUT.
3. Adjust 3.52448-MHz control R35 so that the frequency measured is 3.52448 MHz.

(e) Check of EXT SYNC and phase locking operations

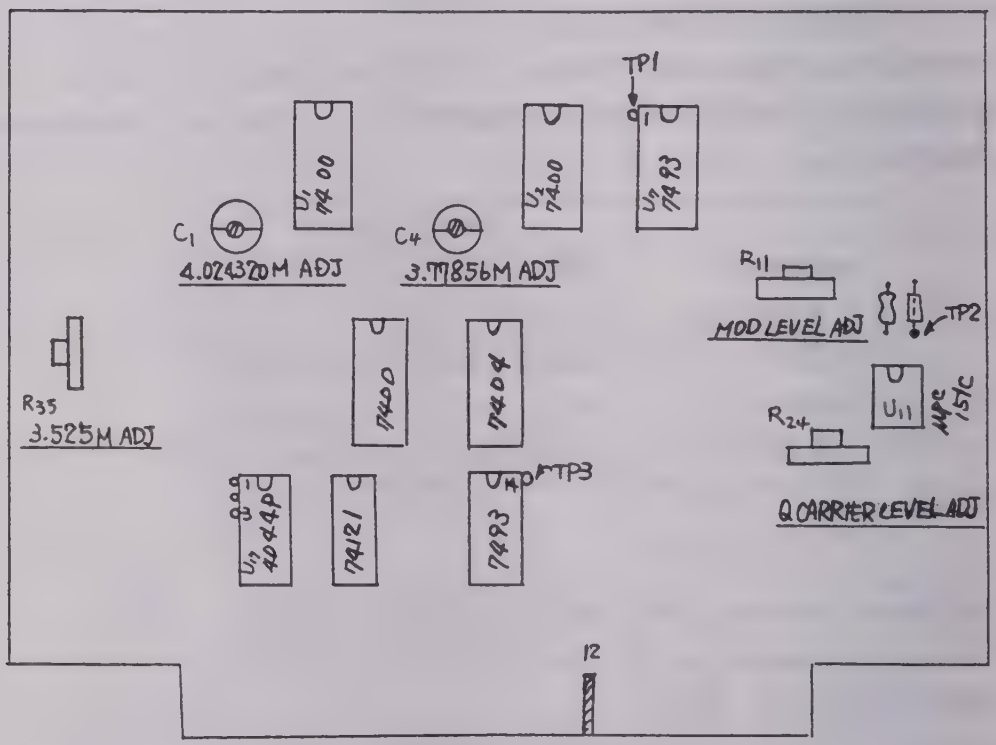
1. Supply a video signal from the color bar generator to the EXT SYNC input terminal.
2. Measure the signals at input pins 1 and 3 of phase detector U17 (MC4044P or µPC1008C) and confirm that phase locking is activated.

o AM section adjustment

1. Connect the oscilloscope to pin 12 of the connector on the AM/SYNC board.
2. Adjust Q-CARRIER LEVEL control R24 and MOD LEVEL control R11 for a 60% AM modulated waveform (see the figure below).



Location of AM/SYNC board controls:



5-8 FM OSCILLATOR CHECK

Insert the MATRIX and PREAMP boards and supply 1-Vrms, 100-Hz AF signals to the EXT AF INPUT L/R channels before beginning checks.

5-8-1 Input signal check

The input signals are checked using the oscilloscope.

(a) 110-kHz input signal

Connect the oscilloscope to connector pin 9. Set the INPUT SELECTOR to EXT AF. Confirm that no signals appear when the OUTPUT/METER FUNCTION and QUE-CARRIER are set to OFF and MAIN, respectively, or the MODE SELECTOR is set to MONO. Also confirm that a 110-kHz pulse waveform appears for all other settings.

(b) 15.734 kHz input signal

Connect the oscilloscope to connector pin 14. Confirm that a 15.734-kHz, asymmetric pulse waveform is displayed on the oscilloscope.

(c) AF input signal

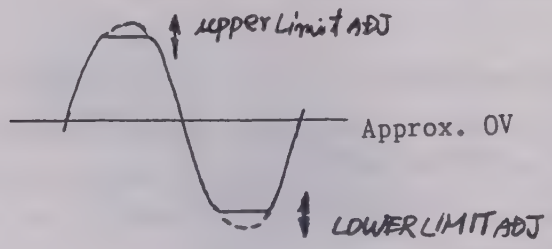
Connect the oscilloscope to connector pin 17. Set the INPUT SELECTOR to EXT AF. Confirm signals are displayed correctly in all settings as specified in the table below.

MODE	MONO	L+R	L	R	L-R	MAIN	SUB
OFF	X	X	X	X	X	X	X
SUB MOD	X	X	V	V	2V	X	2V
QUE-CARRIER	X	X	X	X	X	X	X
SUB-CARRIER	X	X	X	X	X	X	X
MAIN	X	X	X	X	X	X	X
MPX	X	X	V	V	2V	X	2V

Note: X: No signals appear.
V: A signal appear.

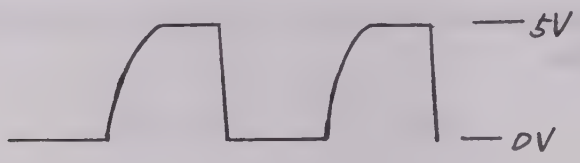
5-8-2 Limiter operation

Connect the oscilloscope to TP1 (pin 6 of U2 μPC159A). Set the INPUT SELECTOR to EXT AF, the MODE SELECTOR to SUB and the OUTPUT/METER to MPX. Confirm that the clipper level changes as shown below when the UPPER LIMIT R10 or LOWER LIMIT R13 controls are turned.



5-8-3 Multi-vibrator oscillation

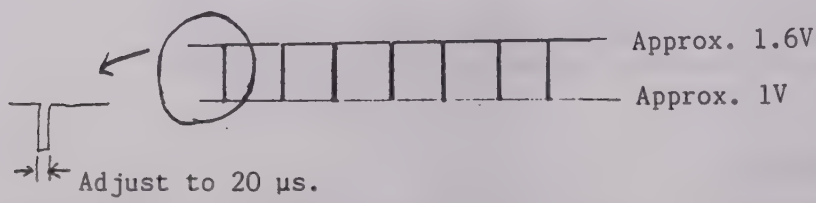
Connect the oscilloscope to TP2 (pin 7 of U4 or U5 μPC271C). Confirm that the oscillation frequency is approximately 140 kHz and the waveform observed on the oscilloscope is as shown below.



Settings: MODE: MAIN, OUTPUT/METER: MPX

5-8-4 Phase locking

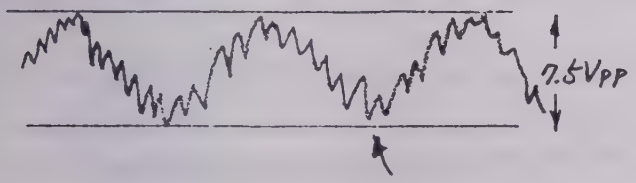
Connect the oscilloscope to TP3 (output pin 5 or 10 of U8 MC4044P or μPC1008C). Adjust the CENTER FREQ control so that the following waveform is obtained.



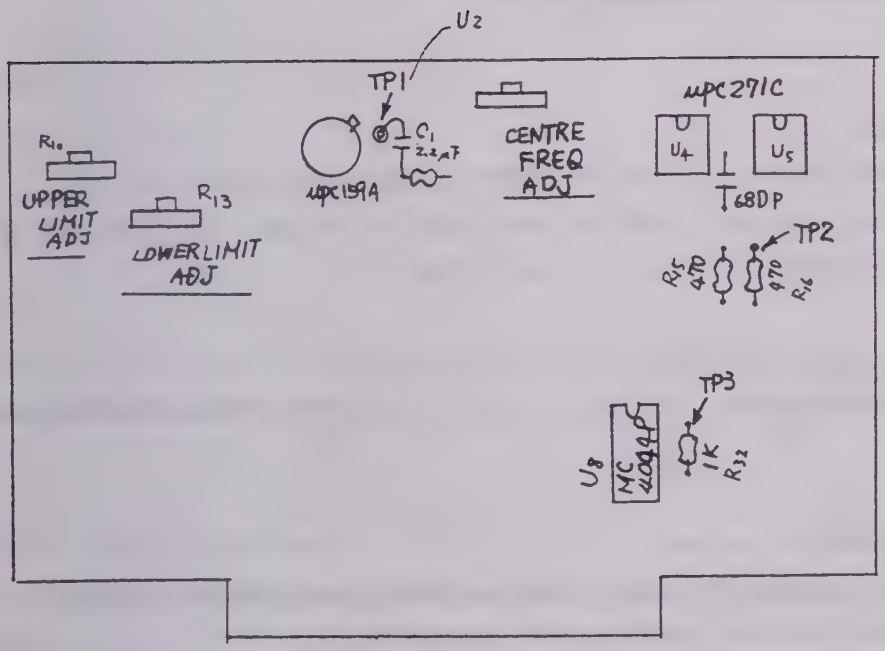
Pulses appear transitionally around about 1.6 V when the control is turned slightly, but they disappear soon.

5-8-5 Mixer

Connect the oscilloscope to connector pin 6. Other settings are the same as before.



The lower frequency of the mixer waveform is 31.5 kHz.

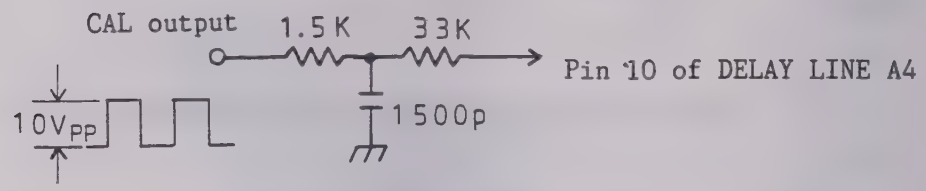


FM OSC PCB

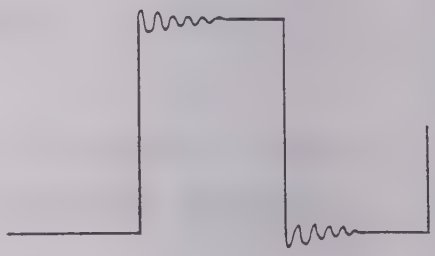
5-9 DELAY LINE CHECK

(1) Install DELAY LINE board A4 and DELAY EQUALIZER A14 in the VP-7681B. Do not turn the power on.

(2) Connect a circuit shown below to the CAL output of the oscilloscope.



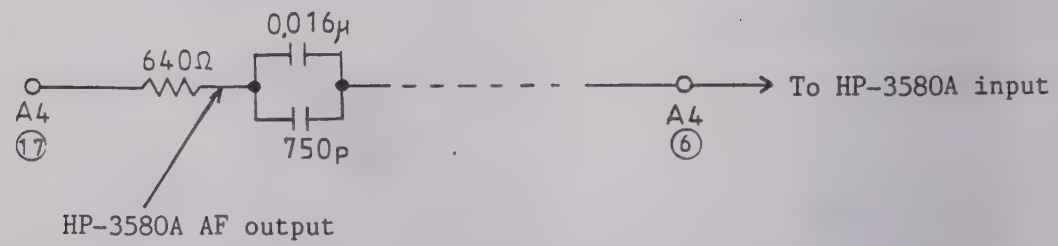
(3) Connect the oscilloscope probe to the semi-fix MAIN level control on the front panel. Confirm the waveform observed on the oscilloscope is as shown on the right.



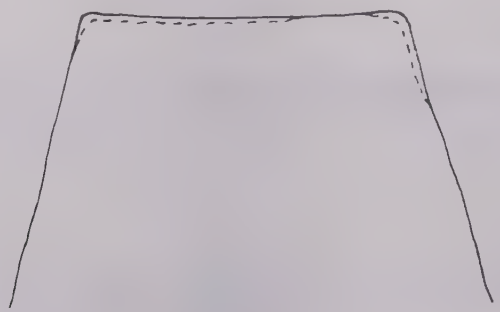
5-10 BPF BOARD

(1) Install BPF board A6 in the VP-7681B and turn the power on.

(2) Connect the AF output from the rear panel of AF spectrum analyzer HP-3580A as shown below.



Store the standard BPF data in the spectrum analyzer and compare waveforms. Confirm that difference is within 0.2 dB.



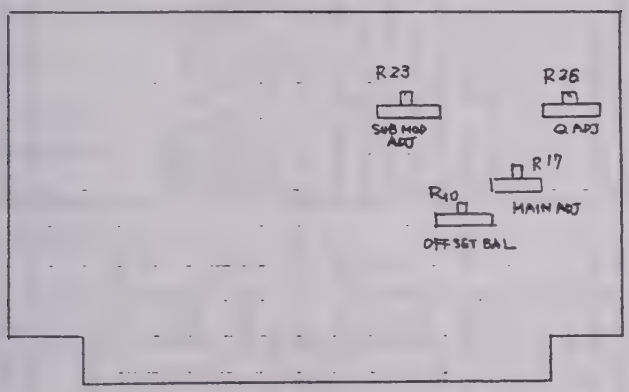
If the result is acceptable, set the BPF coil with Bond.

5-11 MAIN AMPLIFIER and SEMI-FIXED CONTROLS on FRONT PANEL

5-11-1 MAIN AMP DC OFFSET BAL adjustment

All other adjustments must be completed before adjusting the DC offset balance of the main amplifier.

(1) Set the OUTPUT/METER FUNCTION switch to OFF and supply no input signals.
(2) Connect the DC-coupled oscilloscope to connector pin 11 on the A5 board. Adjust OFFSET BAL control R10 (100 kΩ) so that the DC level is "0".



AF/MAIN board

5-11-2 Semi-fix controls on front panel and meter sensitivity adjustments

Conduct adjustments according to instructions in the table on the next page.

5-11-3 INT AF LEVEL adjustment

The adjustment described in 5-9-2 must be completed before this adjustment.

(1) Set the INPUT selector to INT AF and the frequency to 1 kHz.
(2) Set the MODE selector to L+R and the OUTPUT/METER FUNCTION to MAIN.
(3) Adjust the semi-fixed INT AF LEVEL control on the front panel for the meter reading of 100% (MAIN).

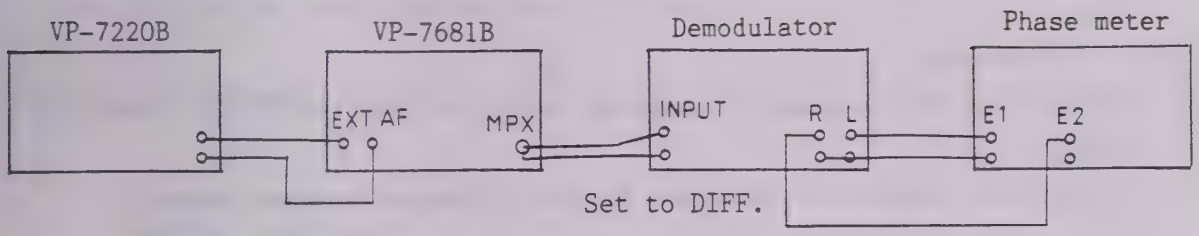
Table 1 Semi-fixed controls on panel and meter sensitivity adjustment

	INPUT SELECTOR	EXTERNAL INPUT	MODE SELECTOR	OUTPUT/ METER FUNCTION	Level adjustment	Meter sensitivity adjustment	Remarks
MAIN LEVEL	EXT AF	Supply a levelcalibrated 1-kHz, 1-Vrms signal to the L/MAIN terminal.	L + R	MAIN	Set the MAIN control on the panel so that the voltage measured at the MPX output terminal is 1 Vp-p when terminated at 75 Ω.(2 Vp-p when the terminal is open).	After level adjustment, adjust MAIN ADJ control R17 on the AF/MAIN board for meter reading of 100% (MAIN).	
SUB CARRIER LEVEL	—	—	L + R	SUB CARRIER	Set the SUBCARRIER control on the panel so that the voltage measured at the MPX output terminal is 0.8 Vp-p when terminated at 75 Ω(1.6 Vp-p when the terminal is open).	Confirm that the meter reads 80% (SC-S) after level adjustment. Set the mode selector switch to MAIN and confirm that the meter reads 60% (SC-M).	
QUE CARRIER LEVEL	—	—	L + R	QUE CARRIER (Set QUE CARRIER LEVEL switch to NORM.)	Set the Q CARRIER control on the panel so that the voltage measured at the MPX output terminal 0.08 Vp-p when terminated at 75 Ω(1.6 Vp-p when the terminal is open).	After level adjustment, adjust variable resistor R26 on the AF/MAIN board for Q-C meter reading of 100%.	Adjust variable resistors for meter readings of 50% and 150% at -SET and +SET, respectively.
SUB MOD LEVEL	EXT AF	Same as that for MAIN LEVEL.	L - R	SUB MOD	Adjust using the 0 to 100% demodulator meter (set the meter function to MOD) so that the level required for meter reading of 100% is ± 10 kHz.	After level adjustment, adjust SUB MOD control R28 on the AF/MAIN board for meter reading of 100% (S-MOD).	

The level values are when the attenuator is 0 dB and the VERNIER is set to CAL.

5-12 DELAY LINE ADJUSTMENT

The setting required is as shown below.



(1) Supply a 4-kHz, 1-Vrms signal from the oscillator to the EXT AF terminal of the VP-7681B.

(2) VP-7681B settings

MODE selector:	L
INPUT selector:	EXT AF
OUTPUT/METER FUNCTION:	MPX

(3) Connect the L output terminal of the demodulator to E1 (reference) of the phase meter (set the mode of the demodulator to DIFF). Connect the R output terminal of the demodulator to E2 of the phase meter. The phase meter must be calibrated beforehand.

(4) Read phase difference indicated on the phase meter and calculate the delay time.

Since 1 cycle (360') at 4 kHz is equal to 250 µs (T=1/f), delay time (T) can be calculated from phase difference using the following formula:

$T_{D(4kHz)}=(250/360)\phi$ (µs)

[For example, delay time per 1° is 0.694 µs.]

(5) Adjust the delay line for -0.7 µs delay time.

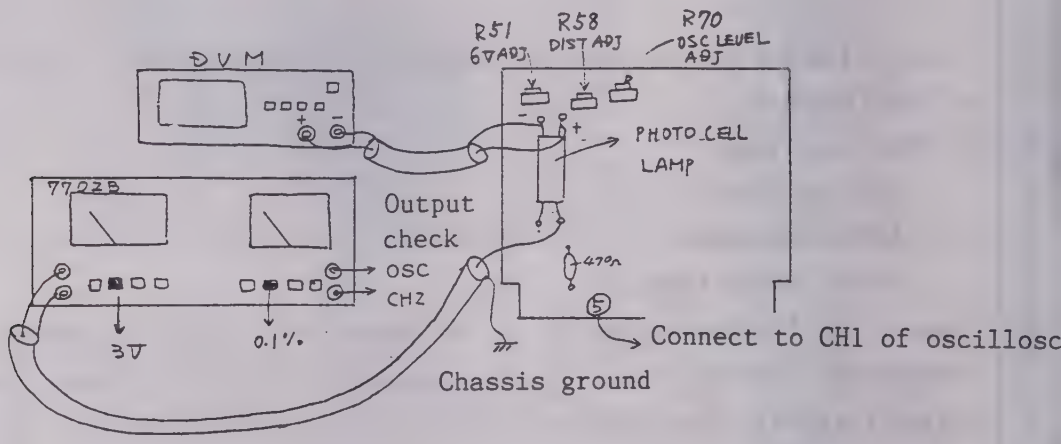
5-13 AF/MAIN (Additional Adjustments)

Note: Items overlapping with those described in Section 5-11 may be omitted.

5-13-1 AF section

(1) Connect the oscilloscope to connector pin 5 (or R80 (470 Ω) on the AF OUT board).

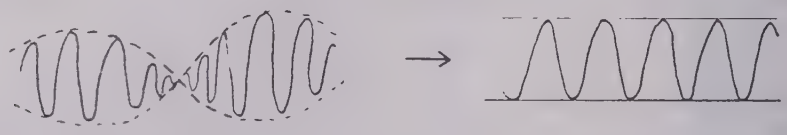
(2) Connect the distortion meter and digital voltmeter as shown below.



(3) The VP-7681B settings

MODE selector:	MONO or STEREO (Press either button.)
INT AF FREQUENCY:	Press the 1 kHz button.

(4) Turn the power on and confirm that 1-kHz signal is oscillated. Conduct rough adjustment using 6V, OSC LEVEL and DIST LEVEL controls if the waveform is irregular as shown below.



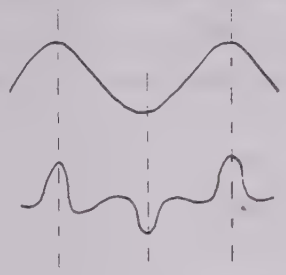
(5) Adjust control R51 so that the voltage measured across the cds lamp using the digital voltmeter is 6V sharp.

(6) Adjust OSC LEVEL control R70 so that the distortion meter input level is 2Vrms.

(7) Adjust DIST control R58 for a distortion meter reading of 0.05%. Confirm that the waveform of the SCOPE output of the distortion meter observed on the oscilloscope is as follows:

Input signal:

Waveform observed:



Notes:

o The oscillation becomes unstable when distortion is reduced to less than 0.02%

o When distortion cannot be reduced to less than 0.03%, oscillation may be activated. Check the input signal of the distortion meter after it passes the 470Ω resistor.

(8) Measure distortion at INT AF FREQ settings of 100 Hz, 200 Hz, 3 kHz, 5 kHz and 7.5 kHz. Confirm that distortion at each setting is less than 0.1%.

(9) Press MULTI MAIN or SUB switch of the MODE selector. Confirm that oscillation frequency observed on the oscilloscope varies when INT AF frequency buttons are pressed.

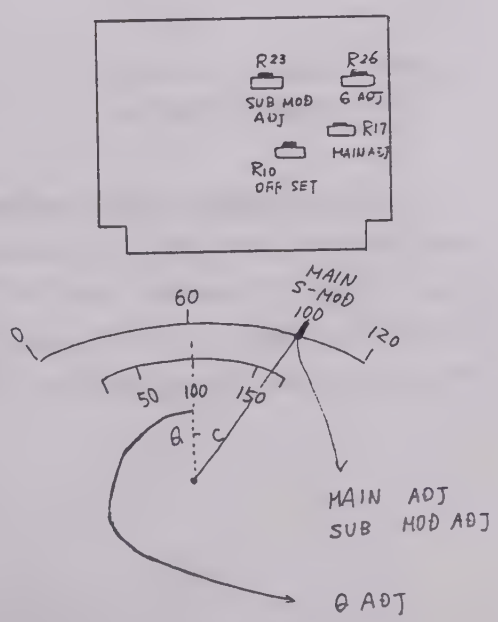
5-13-2 MAIN section

(1) Connect the oscilloscope to pin 6 of U1 μPC159A. Adjust OFFSET control R10 so that the DC waveform level is "0".

(2) Set the OUTPUT/METER FUNCTION to MAIN. Adjust MAIN control R17 so that the meter (0% to 120%) reads 100%.

(3) Set the OUTPUT/METER FUNCTION to QUE CARRIER. Adjust Q control R26 so that the meter (50% to 150%) reads 100%.

(4) Set the OUTPUT/METER FUNCTION to SUB MOD and the MULTI MODE selector to SUB. Adjust SUB MOD control R23 so that the meter (0% to 100%) reads 100%.



5-14 LIMITER ON FM BOARD

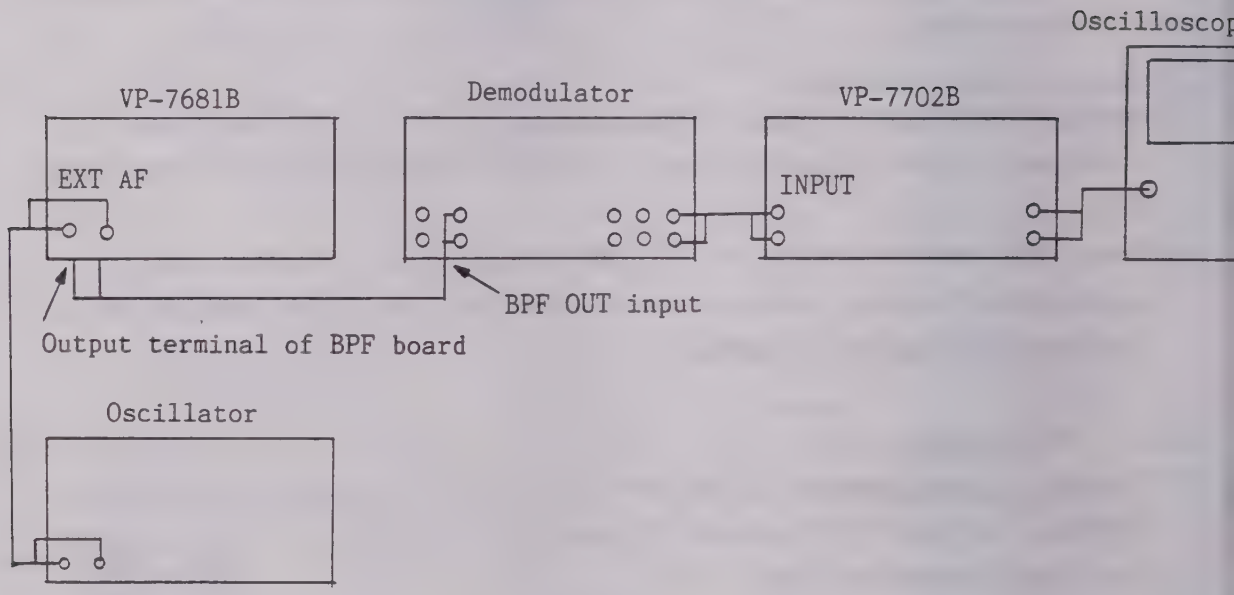
The VP-7681B settings

Input signal:	EXT AF
Input frequency:	1 kHz
Input level:	1 Vrms
MODE selector:	SUB
METER FUNCTION:	MPX
INPUT selector:	EXT AF

The demodulator settings

BPF:	OFF
DEEMPHASIS:	OFF
METER FUNCTION:	MOD
MODE:	DIFF

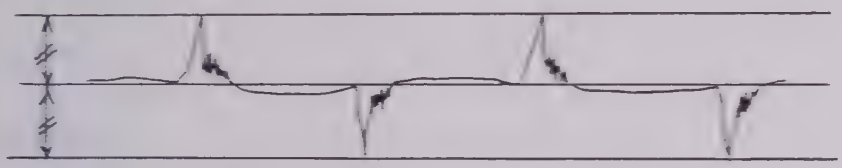
Connection:



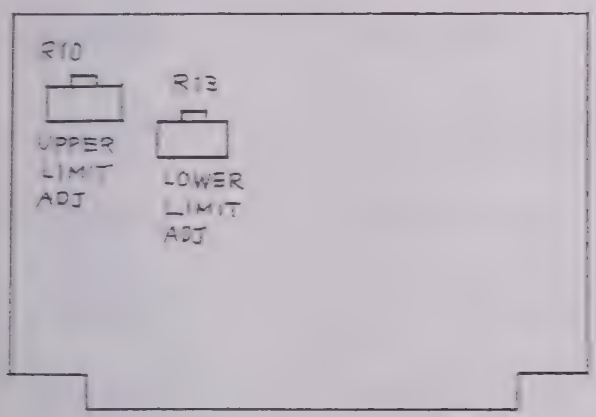
Supply a 100-Hz, 1Vrms (after connection) signal from an external oscillator to the EXT AF terminal of the VP-7681B. Connect the output (pin 6) of BPF board to the BPF OUT input of the demodulator. Set the METER FUNCTION to MOD to read the modulation factor. Adjust SUB MOD control of the VP-7681B so that the demodulator meter reads 100%.

Set the external oscillator so that the demodulator meter reads the maximum (modulation factor of about 110%). Connect the OUTPUT SUB terminal of the demodulator to the VP-7720B, then connect the SCOPE OUT terminal to the oscilloscope. Adjust two controls on the FM OSC board shown below so that the two distortion waveforms displayed are similar.

Waveforms on oscilloscope:



Controls on FM OSC board:



Readjust the controls on the FM OSC board so that waveforms observed after setting the external oscillator output level for modulation factors of 100% and 105% are similar.

Confirm that the distortion waveform becomes worse as the modulation factor exceeds 105%.

SECTION 6. PARTS LIST

TV SOUND MULTIPLEX MODULATOR VP-7681B

	PART NO	DESCRIPTION
1.	4G203668	P7681B POWER SUPPLY
2.	4G203672	P7681B PRE AMP/LPF
3.	4G203674	P7681B DELAY LINE
4.	4G203675	P7681B AF/MAIN
5.	4G203676	P7681B BPF
6.	4G203677	P7681B FM OSC/OD
7.	4G203678	P7681B MATRIX
8.	4G203679	P7681B AM/SYNC
9.	4G203680	P7681B ATT(75)
10.	4G203682	P7681B MODE SW
11.	4G203683	P7681B DELAY EQ
12.	4G203687	P7681B OVERALL
13.	4G302110	P7681B MECHA

PARTS LIST

A P7681B POWER SU DWG NO 46203668

REF NO	QTY	PART NO	DESCRIPTION		MFR DEF
C 0606	1	ECET35R222SW	C:FXD AL ELECT	2200UF +30%-10% 35V	29881
C 0607	1	ECCW1H101K5	C:FXD CER TC	100PF +-10% 50V SL	29891
C 0608	1	ECEA1CU471	C:FXD AL ELECT	470UF +-20% 16V	29881
C 0609	1	ECET35R222SW	C:FXD AL ELECT	2200UF +30%-10% 35V	29881
C 0610	1	ECCW1H101K5	C:FXD CER TC	100PF +-10% 50V SL	29891
C 0611	1	ECEA1CU471	C:FXD AL ELECT	470UF +-20% 16V	29881
C 0612	1	ECET35R222SW	C:FXD AL ELECT	2200UF +30%-10% 35V	29881
C 0613	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29881
CR 0602	1	S1RBA20F	DIODE:PWR RECT	1A 200V	12151
CR 0603	1	S1RBA20F	DIODE:PWR RECT	1A 200V	12151
CR 0604	1	S1RBA20F	DIODE:PWR RECT	1A 200V	12151
CR 0605	1	78A26	DIODE:ZENER	1SZ54 SELECT	12167
E 0001	1	26400537-1	PCB,POWER	P7680A	1F89A
Q 0605	1	2SC2258	TSTR:SI NPN	PC:1W FT:100MHZ	29269
Q 0606	1	2SD389-PB	TSTR:SI NPN	PC:25W FT:25MHZ	29269
Q 0607	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0608	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0609	1	2SC2258	TSTR:SI NPN	PC:1W FT:100MHZ	29269
Q 0610	1	2SD389-PB	TSTR:SI NPN	PC:25W FT:25MHZ	29269
Q 0611	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
R 0610	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	19661

0125

PARTS LIST

A P7681B POWER SU DWG NO 46203668

REF NO	QTY	PART NO	DESCRIPTION		MFR DEF
R 0611	1	ERW12PK1R0	R:FXD WW	1 OHM 10% 1/2W	29560
R 0612	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29561
R 0613	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29561
R 0614	1	ERD25TJ152V	R:FXD CARBON	1.5K OHM 5% 1/4W	29561
R 0615	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W	29561
R 0616	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W	29561
R 0617	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W	29561
R 0618	1	RN1/8PD222B	R:NWP COMP	2.2K OHM 25% 1/8W	11154
R 0619	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29561
R 0620	1	ERW12PK1R0	R:FXD WW	1 OHM 10% 1/2W	29560
R 0621	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29561
R 0622	1	ERD25TJ152V	R:FXD CARBON	1.5K OHM 5% 1/4W	29561
R 0623	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29561
R 0624	1	ERDS2TKF1002	R:FXD MET FLM	10.0K OHM 1% 1/4W	29561
R 0625	1	ERDS2TKF1002	R:FXD MET FLM	10.0K OHM 1% 1/4W	19661
U 0602	1	UPC157A	IC:OP AMP		12167
U 0603	1	UPC157A	IC:OP AMP		12167
U 0604	1	UPC14305H	IC:V REGTR	+5V 1A	12167

PARTS LIST

A P7681B PRE AMP/ DWG NO 4G203672

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
C 0001	1	1MFTP105J	C:FXD FLM	1UF 5% 100V	17194
C 0002	1	1MFTP105J	C:FXD FLM	1UF 5% 100V	17194
C 0003	1	ECCW1H150K5	C:FXD CER TC	15PF +-10% 50V SL	29890
C 0004	1	ECCF1H050D	C:FXD CER TC	5PF +-0.5PF 50V SL	29890
C 0005	1	ECQP1912FZ	C:FXD FLM	9100PF 1% 100V	26550
C 0006	1	XDM20C681J5	C:FXD MICA	680PF 5% 500V	12440
C 0007	1	ECQP1133FZ	C:FXD FLM	0.013UF 1% 100V	26550
C 0008	1	XDM20C681J5	C:FXD MICA	680PF 5% 500V	12440
C 0009	1	ECQP1243FZ	C:FXD FLM	0.024UF 1% 100V	26550
C 0010	1	XDM15C271J5	C:FXD MICA	270PF 5% 500V	12440
C 0011	1	ECQP1622FZ	C:FXD FLM	6200PF 1% 100V	26550
C 0012	1	XDM15C820K5	C:FXD MICA	82PF 10% 500V	12440
C 0013	1	ECQP1273FZ	C:FXD FLM	0.027UF 1% 100V	26550
C 0014	1	ECQP1182FZ	C:FXD FLM	1800PF 1% 100V	26550
C 0015	1	ECQP1202FZ	C:FXD FLM	2000PF 1% 100V	26550
C 0016	1	XDM15C151J5	C:FXD MICA	150PF 5% 500V	12440
C 0017	1	ECQP1153FZ	C:FXD FLM	0.015UF 1% 100V	26550
C 0018	1	ECQP1152FZ	C:FXD FLM	1500PF 1% 100V	26550
C 0019	1	QS25F7501	C:FXD FLM	7500PF 1% 50V	12956
C 0020	1	ECCF1H050D	C:FXD CER TC	5PF +-0.5PF 50V SL	29890
C 0021	1	1MFTP105J	C:FXD FLM	1UF 5% 100V	17194
C 0022	1	1MFTP105J	C:FXD FLM	1UF 5% 100V	17194
C 0023	1	ECCW1H150K5	C:FXD CER TC	15PF +-10% 50V SL	29890
C 0024	1	ECCF1H050D	C:FXD CER TC	5PF +-0.5PF 50V SL	29890
C 0025	1	ECQP1912FZ	C:FXD FLM	9100PF 1% 100V	26550
C 0026	1	XDM20C681J5	C:FXD MICA	680PF 5% 500V	12440
C 0027	1	ECQP1133FZ	C:FXD FLM	0.013UF 1% 100V	26550
C 0028	1	XDM20C681J5	C:FXD MICA	680PF 5% 500V	12440
C 0029	1	ECQP1243FZ	C:FXD FLM	0.024UF 1% 100V	26550
C 0030	1	XDM15C271J5	C:FXD MICA	270PF 5% 500V	12440

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PARTS LIST

A P7681B PRE AMP/ DWG NO 4G203672

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
C 0031	1	ECQP1622FZ	C:FXD FLM	6200PF 1% 100V	26550
C 0032	1	XDM15C820K5	C:FXD MICA	82PF 10% 500V	12440
C 0033	1	ECQP1273FZ	C:FXD FLM	0.027UF 1% 100V	26550
C 0034	1	ECQP1182FZ	C:FXD FLM	1800PF 1% 100V	26550
C 0035	1	ECQP1202FZ	C:FXD FLM	2000PF 1% 100V	26550
C 0036	1	XDM15C151J5	C:FXD MICA	150PF 5% 500V	12440
C 0037	1	ECQP1153FZ	C:FXD FLM	0.015UF 1% 100V	26550
C 0038	1	ECQP1152FZ	C:FXD FLM	1500PF 1% 100V	26550
C 0039	1	ECCF1H050D	C:FXD CER TC	5PF +-0.5PF 50V SL	29890
C 0040	1	QS25F7501	C:FXD FLM	7500PF 1% 50V	12956
C 0041	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29880
C 0042	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29880
C 0043	1	ECEA1CU470	C:FXD AL ELECT	47UF +-20% 16V	29880
C 0044	1	ECEA1CU470	C:FXD AL ELECT	47UF +-20% 16V	29880
C 0045	1	ECEA1CU470	C:FXD AL ELECT	47UF +-20% 16V	29880
C 0046	1	ECEA1CU470	C:FXD AL ELECT	47UF +-20% 16V	29880
CR 0001	1	MA150TA	DIODE:SI	100MA 35V	29269
CR 0002	1	MA150TA	DIODE:SI	100MA 35V	29269
E 0001	1	2G400712	PCB/PREAMP	P7681B	ORGNL
K 0001	1	AG6029	RELAY	5V 25MA DPST	29246
K 0002	1	AG6029	RELAY	5V 25MA DPST	29246

PARTS LIST

A P7681B PRE AMP/ DWG NO 4G203672

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
L 0001	1	4G431270	COIL	P7681A LPF	ORGNL
L 0002	1	4G431271	COIL	P7681A LPF	ORGNL
L 0003	1	4G431272	COIL	P7681A LPF	ORGNL
L 0011	1	4G431270	COIL	P7681A LPF	ORGNL
L 0012	1	4G431271	COIL	P7681A LPF	ORGNL
L 0013	1	4G431272	COIL	P7681A LPF	ORGNL
Q 0001	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0002	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0003	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0004	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0005	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0006	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0007	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0008	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0009	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0010	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0011	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0012	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0013	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0014	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
R 0001	1	ERQS2TKF3093	R:FXD MET FLM	309K OHM 1% 1/4W	29860
R 0002	1	ERQS2TKF3093	R:FXD MET FLM	309K OHM 1% 1/4W	29860
R 0003	1	ERQS2TKF2002	R:FXD MET FLM	20.0K OHM 1% 1/4W	29860
R 0004	1	ERQS2TKF2002	R:FXD MET FLM	20.0K OHM 1% 1/4W	29860
R 0005	1	A14H4237B201	R:VAR CARBON	200 OHM 20% 3/4W	16551

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PARTS LIST

A P7681B PRE AMP/ DWG NO 4G203672

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R 0006	1	ERQS2TKF2002	R:FXD MET FLM	20.0K OHM 1% 1/4W	29860
R 0007	1	ERQS2TKF2002	R:FXD MET FLM	20.0K OHM 1% 1/4W	29860
R 0008	1	ERQS2TKF4531	R:FXD MET FLM	4.53K OHM 1% 1/4W	29860
R 0009	1	A14H4237B102	R:VAR CARBON	1K OHM 20% 3/4W	16551
R 0010	1	ERQS2TKF4531	R:FXD MET FLM	4.53K OHM 1% 1/4W	29860
R 0011	1	ERQS2TKF4531	R:FXD MET FLM	4.53K OHM 1% 1/4W	29860
R 0012	1	A14H4237B102	R:VAR CARBON	1K OHM 20% 3/4W	16551
R 0013	1	ERQS2TKF4531	R:FXD MET FLM	4.53K OHM 1% 1/4W	29860
R 0014	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R 0015	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R 0016	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R 0017	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R 0018	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R 0019	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R 0020	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R 0021	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R 0022	1	ERQS2TKF4991	R:FXD MET FLM	4.99K OHM 1% 1/4W	29860
R 0023	1	ERQS2TKF4991	R:FXD MET FLM	4.99K OHM 1% 1/4W	29860
R 0024	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R 0025	1	ERQS2TKF2491	R:FXD MET FLM	2.49K OHM 1% 1/4W	29860
R 0026	1	ERD25TJ473V	R:FXD CARBON	47K OHM 5% 1/4W	29860
R 0027	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W	29860
R 0028	1	ERQS2TKF6040	R:FXD MET FLM	604 OHM 1% 1/4W	29860
R 0029	1	ERQS2TKF6040	R:FXD MET FLM	604 OHM 1% 1/4W	29860
R 0030	1	ERQS2TKF1002	R:FXD MET FLM	10.0K OHM 1% 1/4W	29860
R 0031	1	ERQS2TKF4750	R:FXD MET FLM	475 OHM 1% 1/4W	29860
R 0032	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W	29860
R 0033	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W	29860
R 0034	1	ERQS2TKF3093	R:FXD MET FLM	309K OHM 1% 1/4W	29860
R 0035	1	ERQS2TKF3093	R:FXD MET FLM	309K OHM 1% 1/4W	29860

PARTS LIST

A P7681B PRE AMP/ DWG NO 4G203672

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R	0036	1	ERO S2TKF2002	R:FXD MET FLM	20.0K OHM 1% 1/4W	29860
R	0037	1	ERO S2TKF2002	R:FXD MET FLM	20.0K OHM 1% 1/4W	29860
R	0038	1	ERO S2TKF2002	R:FXD MET FLM	20.0K OHM 1% 1/4W	29860
R	0039	1	A14H4237B201	R:VAR CARBON	200 OHM 20% 3/4W	16551
R	0040	1	ERO S2TKF2002	R:FXD MET FLM	20.0K OHM 1% 1/4W	29860
R	0041	1	ERO S2TKF4531	R:FXD MET FLM	4.53K OHM 1% 1/4W	29860
R	0042	1	A14H4237B102	R:VAR CARBON	1K OHM 20% 3/4W	16551
R	0043	1	ERO S2TKF4531	R:FXD MET FLM	4.53K OHM 1% 1/4W	29860
R	0044	1	ERO S2TKF4531	R:FXD MET FLM	4.53K OHM 1% 1/4W	29860
R	0045	1	A14H4237B102	R:VAR CARBON	1K OHM 20% 3/4W	16551
R	0046	1	ERO S2TKF4531	R:FXD MET FLM	4.53K OHM 1% 1/4W	29860
R	0047	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R	0048	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R	0049	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R	0050	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R	0051	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R	0052	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R	0053	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R	0054	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R	0055	1	ERO S2TKF1002	R:FXD MET FLM	10.0K OHM 1% 1/4W	29860
R	0056	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R	0057	1	ERO S2TKF1002	R:FXD MET FLM	10.0K OHM 1% 1/4W	29860
R	0058	1	ERO S2TKF4531	R:FXD MET FLM	4.53K OHM 1% 1/4W	29860
R	0059	1	A14H4237B102	R:VAR CARBON	1K OHM 20% 3/4W	16551
R	0060	1	ERO S2TKF4531	R:FXD MET FLM	4.53K OHM 1% 1/4W	29860
R	0061	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R	0062	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R	0063	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R	0064	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R	0065	1	ERO S2TKF2491	R:FXD MET FLM	2.49K OHM 1% 1/4W	29860

0131

PARTS LIST

A P7681B PRE AMP/ DWG NO 4G203672

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R	0066	1	ERO S2TKF4991	R:FXD MET FLM	4.99K OHM 1% 1/4W	29860
R	0067	1	ERO S2TKF4991	R:FXD MET FLM	4.99K OHM 1% 1/4W	29860
R	0068	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R	0069	1	ERO S2TKF6040	R:FXD MET FLM	604 OHM 1% 1/4W	29860
R	0070	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W	29860
R	0071	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W	29860
R	0072	1	ERO S2TKF6040	R:FXD MET FLM	604 OHM 1% 1/4W	29860
R	0073	1	ERO S2TKF1002	R:FXD MET FLM	10.0K OHM 1% 1/4W	29860
R	0074	1	ERO S2TKF4750	R:FXD MET FLM	475 OHM 1% 1/4W	29860
R	0075	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W	29860
R	0076	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W	29860
R	0077	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
R	0078	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
U	0001	1	UPC157C	IC:OP AMP		12167
U	0002	1	UPC159A	IC:OP AMP		12167
U	0003	1	UPC159A	IC:OP AMP		12167
U	0004	1	UPC157C	IC:OP AMP		12167
U	0005	1	UPC159A	IC:OP AMP		12167
U	0006	1	UPC159A	IC:OP AMP		12167
U	0007	1	UPC159A	IC:OP AMP		12167

PARTS LIST

A P7681B DELAY LI DWG NO 4G203674

REF NO	QTY	PART NO	DESCRIPTION		MFR DEF
C 0001	1	QS25F5000	C:FXD FLM	500PF 1% 50V	12954
C 0002	1	QS25F5000	C:FXD FLM	500PF 1% 50V	12954
C 0003	1	QS25F1001	C:FXD FLM	1000PF 1% 50V	12954
C 0004	1	QS25F1001	C:FXD FLM	1000PF 1% 50V	12954
C 0005	1	QS25F1001	C:FXD FLM	1000PF 1% 50V	12954
C 0006	1	QS25F1001	C:FXD FLM	1000PF 1% 50V	12954
C 0007	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12954
C 0008	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12954
C 0009	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12954
C 0010	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12954
C 0011	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12954
C 0012	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0013	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0014	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0015	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0016	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0017	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0018	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0019	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0020	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0021	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0022	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0023	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0024	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0025	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0026	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0027	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12954
C 0033	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12954

0133

PARTS LIST

A P7681B DELAY LI DWG NO 4G203674

REF NO	QTY	PART NO	DESCRIPTION		MFR DEF
E 0001	1	2G400713	PCB,DELAY LINE	P7681B	[illegible]
L 0001	1	FS0810S102K	COIL:CHOKE	1MH 10%	13977
L 0002	1	FS1012S202J	COIL:CHOKE	2000UH 5%	13977
L 0003	1	FS1012S202J	COIL:CHOKE	2000UH 5%	13977
L 0004	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0005	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0006	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0007	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0008	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0009	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0010	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0011	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0012	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0013	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0014	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0015	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0016	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0017	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0018	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0019	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0020	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0021	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L 0022	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
R 0001	1	ER0S2TKF1001	R:FXD MET FLM	1K OHM 1% 1/4W	[illegible]
R 0002	1	ER025TJ393V	R:FXD CARBON	39K OHM 5% 1/4W	[illegible]

PARTS LIST

A P7681B DELAY LI DWG NO 4G203674

REF NO	QTY	PART NO	DESCRIPTION	MFR/DBR
R 0003	1	ERD25TJ393V	R:FXD CARBON 39K OHM 5% 1/4W	29860
R 0004	1	ERD25TJ393V	R:FXD CARBON 39K OHM 5% 1/4W	29860
R 0005	1	ERD25TJ393V	R:FXD CARBON 39K OHM 5% 1/4W	29860
R 0006	1	ERD25TJ101V	R:FXD CARBON 100 OHM 5% 1/4W	29860
R 0007	1	ERD25TJ393V	R:FXD CARBON 39K OHM 5% 1/4W	29860
R 0008	1	ERD25TJ393V	R:FXD CARBON 39K OHM 5% 1/4W	29860
R 0009	1	ERD25TJ393V	R:FXD CARBON 39K OHM 5% 1/4W	29860

0135

PARTS LIST

A P7681B AF/MAIN DWG NO 4G203675

REF NO	QTY	PART NO	DESCRIPTION	MFR/DBR
C 0001	1	ECCF1H050D	C:FXD CER TC 5PF +-0.5PF 50V SL	29890
C 0002	1	ECEA1CU100	C:FXD AL ELECT 10UF +-20% 16V	29880
C 0003	1	ECCF1H050D	C:FXD CER TC 5PF +-0.5PF 50V SL	29890
C 0004	1	ECEA1CU101	C:FXD AL ELECT 100UF +-20% 16V	29880
C 0005	1	ECEA1CU100	C:FXD AL ELECT 10UF +-20% 16V	29880
C 0006	1	QS25F1002	C:FXD FLM 0.01UF 1% 50V	12956
C 0007	1	QS25F1002	C:FXD FLM 0.01UF 1% 50V	12956
C 0008	1	ECCF1H050D	C:FXD CER TC 5PF +-0.5PF 50V SL	29890
C 0009	1	ECEA1CU100	C:FXD AL ELECT 10UF +-20% 16V	29880
C 0010	1	ECEA1CU100	C:FXD AL ELECT 10UF +-20% 16V	29880
C 0011	1	ECEA1HU010	C:FXD AL ELECT 1UF +-20% 50V	29880
C 0012	1	ECEA1HU010	C:FXD AL ELECT 1UF +-20% 50V	29880
C 0013	1	ECEA1HU010	C:FXD AL ELECT 1UF +-20% 50V	29880
C 0014	1	ECEA1HU010	C:FXD AL ELECT 1UF +-20% 50V	29880
C 0015	1	ECEA1CN101S	C:FXD AL ELECT 100UF +-20% 16V	29880
C 0016	1	ECEA1CU101	C:FXD AL ELECT 100UF +-20% 16V	29880
C 0017	1	ECEA1CU101	C:FXD AL ELECT 100UF +-20% 16V	29880
C 0018	1	ECEA1CU101	C:FXD AL ELECT 100UF +-20% 16V	29880
C 0019	1	ECEA1CU101	C:FXD AL ELECT 100UF +-20% 16V	29880
C 0020	1	ECEA1CU101	C:FXD AL ELECT 100UF +-20% 16V	29880
C 0021	1	ECEA1CU470	C:FXD AL ELECT 47UF +-20% 16V	29880
C 0022	1	ECEA1CU470	C:FXD AL ELECT 47UF +-20% 16V	29880
C 0023	1	ECEA1CU470	C:FXD AL ELECT 47UF +-20% 16V	29880
CR 0001	1	MA150TA	DIODE:SI 100MA 35V	29269
CR 0002	1	MA150TA	DIODE:SI 100MA 35V	29269
CR 0003	1	MA150TA	DIODE:SI 100MA 35V	29269
CR 0004	1	MA150TA	DIODE:SI 100MA 35V	29269
CR 0005	1	MA150TA	DIODE:SI 100MA 35V	29269

PARTS LIST

A P7681B AF/MAIN DWG NO 4G203675

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
CR	0006	1	MA150TA	DIODE:SI	100MA 35V	29269
CR	0007	1	MA150TA	DIODE:SI	100MA 35V	29269
CR	0008	1	MA150TA	DIODE:SI	100MA 35V	29269
E	0001	1	2G400714	PCB,AF/MAIN	P7681B	ORGNL
Q	0001	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q	0002	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q	0003	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269
Q	0004	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q	0005	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q	0006	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269
Q	0007	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q	0008	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269
Q	0009	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269
Q	0010	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269
Q	0011	1	2SC2258	TSTR:SI NPN	PC:1W FT:100MHZ	29269
R		1	A14H4237B103	R:VAR CARBON	10K OHM 20% 3/4W	16551
R		1	ERQS2TKF2151	R:FXD MET FLM	2.15K OHM 1% 1/4W	29860
R		2	ERQS2TKF5361	R:FXD MET FLM	5.36K OHM 1% 1/4W	29860
R	0001	1	ERQS2TKF4870	R:FXD MET FLM	487 OHM 1% 1/4W	29860
R	0002	1	ERQS2TKF1212	R:FXD MET FLM	12.1K OHM 1% 1/4W	29860
R	0003	1	ERQS2TKF1211	R:FXD MET FLM	1.21K OHM 1% 1/4W	29860
R	0004	1	ERQS2TKF6810	R:FXD MET FLM	681 OHM 1% 1/4W	29860
R	0005	1	ERQS2TKF1501	R:FXD MET FLM	1.5K OHM 1% 1/4W	29860

PARTS LIST

A P7681B AF/MAIN DWG NO 4G203675

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R	0006	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W	29860
R	0007	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W	29860
R	0008	1	ERD25TJ562V	R:FXD CARBON	5.6K OHM 5% 1/4W	29860
R	0010	1	A14H4237B104	R:VAR CARBON	100K OHM 20% 3/4W	16551
R	0011	1	ERD25TJ104V	R:FXD CARBON	100K OHM 5% 1/4W	29860
R	0012	1	ERD25TJ331V	R:FXD CARBON	330 OHM 5% 1/4W	29860
R	0013	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R	0014	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R	0015	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
R	0016	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
R	0017	1	A14H4237B202	R:VAR CARBON	2K OHM 20% 3/4W	16551
R	0019	1	ERQS2TKF4750	R:FXD MET FLM	475 OHM 1% 1/4W	29860
R	0020	1	ERQS2TKF1001	R:FXD MET FLM	1K OHM 1% 1/4W	29860
R	0021	1	ERQS2TKF1001	R:FXD MET FLM	1K OHM 1% 1/4W	29860
R	0022	1	ERQS2TKF2741	R:FXD MET FLM	2.74K OHM 1% 1/4W	29860
R	0023	1	A14H4237B502	R:VAR CARBON	5K OHM 20% 3/4W	16551
R	0024	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W	29860
R	0025	1	ERQS2TKF1500	R:FXD MET FLM	150 OHM 1% 1/4W	29860
R	0026	1	A14H4237B201	R:VAR CARBON	200 OHM 20% 3/4W	16551
R	0027	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W	29860
R	0028	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W	29860
R	0029	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W	29860
R	0030	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0031	1	ERQS2TKF1583	R:FXD MET FLM	158K OHM 1% 1/4W	29860
R	0032	1	ERQS2TKF1583	R:FXD MET FLM	158K OHM 1% 1/4W	29860
R	0033	1	ERQS2TKF1742	R:FXD MET FLM	17.4K OHM 1% 1/4W	29860
R	0034	1	ERQS2TKF1742	R:FXD MET FLM	17.4K OHM 1% 1/4W	29860
R	0037	1	ERQS2TKF3091	R:FXD MET FLM	3.09K OHM 1% 1/4W	29860

PARTS LIST

A P7681B AF/MAIN DWG NO 4G203675

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R	0038	1	ERQS2TKF3091	R:FXD MET FLM	3.09K OHM 1% 1/4W	29860
R	0039	1	ERQS2TKF2051	R:FXD MET FLM	2.05K OHM 1% 1/4W	29860
R	0040	1	ERQS2TKF2051	R:FXD MET FLM	2.05K OHM 1% 1/4W	29860
R	0041	1	ERQS2TKF1583	R:FXD MET FLM	158K OHM 1% 1/4W	29860
R	0042	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0043	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0044	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0045	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0046	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R	0047	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0048	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R	0049	1	ERD25TJ221V	R:FXD CARBON	220 OHM 5% 1/4W	29860
R	0050	1	ERD25TJ132V	R:FXD CARBON	1.3K OHM 5% 1/4W	29860
R	0051	1	A14H4237B501	R:VAR CARBON	500 OHM 20% 3/4W	16551
R	0052	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29860
R	0053	1	ERQS2TKF1583	R:FXD MET FLM	158K OHM 1% 1/4W	29860
R	0054	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0055	1	ERQS2TKF3921	R:FXD MET FLM	3.92K OHM 1% 1/4W	29860
R	0056	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R	0057	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R	0058	1	A14H4237B202	R:VAR CARBON	2K OHM 20% 3/4W	16551
R	0059	1	ERQS2TKF3921	R:FXD MET FLM	3.92K OHM 1% 1/4W	29860
R	0060	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R	0061	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29860
R	0062	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0063	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W	29860
R	0064	1	ERD25TJ752V	R:FXD CARBON	7.5K OHM 5% 1/4W	29860
R	0065	1	ERD25TJ562V	R:FXD CARBON	5.6K OHM 5% 1/4W	29860
R	0066	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W	29860
R	0067	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W	29860

0139

PARTS LIST

A P7681B AF/MAIN DWG NO 4G203675

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R	0068	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R	0069	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R	0070	1	A14H4237B502	R:VAR CARBON	5K OHM 20% 3/4W	16551
R	0071	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W	29860
R	0072	1	ERD25TJ393V	R:FXD CARBON	39K OHM 5% 1/4W	29860
R	0073	1	ERD25TJ105V	R:FXD CARBON	1M OHM 5% 1/4W	29860
R	0074	1	ERD25TJ153V	R:FXD CARBON	15K OHM 5% 1/4W	29860
R	0075	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0076	1	ERD25TJ153V	R:FXD CARBON	15K OHM 5% 1/4W	29860
R	0077	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29860
R	0078	1	ERD25TJ104V	R:FXD CARBON	100K OHM 5% 1/4W	29860
R	0079	1	ERD25TJ221V	R:FXD CARBON	220 OHM 5% 1/4W	29860
R	0080	1	ERD25TJ471V	R:FXD CARBON	470 OHM 5% 1/4W	29860
R	0081	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
R	0082	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
R	0083	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
R	0084	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
R	0085	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
R	0086	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R	0087	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
RT	0001	1	1V018	P763A PHOTOCELL	MCL-713B	16960
U	0001	1	UPC159A	IC:OP AMP		12167
U	0002	1	UPC159A	IC:OP AMP		12167
U	0003	1	UPD4066C	IC:C MOS	QUAD BILATERAL SWITCH	12167
U	0004	1	UPD4066C	IC:C MOS	QUAD BILATERAL SWITCH	12167
U	0005	1	UPD4066C	IC:C MOS	QUAD BILATERAL SWITCH	12167

PARTS LIST

A P7681B AF/MAIN DWG NO 4G203675

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
U 0006	1	UPC159A	IC:OP AMP		12167
9	1	ERO52TKF2321	R:FXD MET FLM	2.32K OHM 1% 1/4W	29860

0141

PARTS LIST

A P7681B BPF DWG NO 4G203676

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
C	2	ECQP1162FZ	C:FXD FLM	1600PF 1% 100V	26550
C 0001	1	ECCW1H221K5	C:FXD CER TC	220PF +-10% 50V SL	29890
C 0002	1	ECQP1183FZ	C:FXD FLM	0.018UF 1% 100V	26550
C 0003	1	ECQP1104FZ	C:FXD FLM	0.1UF 1% 100V	26550
C 0004	1	ECQP1183FZ	C:FXD FLM	0.018UF 1% 100V	26550
C 0010	1	ECQP1103FZ	C:FXD FLM	0.01UF 1% 100V	26550
C 0011	1	ECCW1H101K5	C:FXD CER TC	100PF +-10% 50V SL	29890
C 0013	1	ECQP1102FZ	C:FXD FLM	1000PF 1% 100V	26550
C 0014	1	ECQP1332FZ	C:FXD FLM	3300PF 1% 100V	26550
C 0015	1	ECCW1H390K5	C:FXD CER TC	39PF +-10% 50V SL	29890
C 0020	1	ECQP1202FZ	C:FXD FLM	2000PF 1% 100V	26550
C 0021	1	ECCW1H150K5	C:FXD CER TC	15PF +-10% 50V SL	29890
C 0022	1	ECQP1302FZ	C:FXD FLM	3000PF 1% 100V	26550
C 0023	1	ECQP1432FZ	C:FXD FLM	4300PF 1% 100V	26550
C 0024	1	ECQP1472FZ	C:FXD FLM	4700PF 1% 100V	26550
C 0025	1	ECQP1302FZ	C:FXD FLM	3000PF 1% 100V	26550
C 0026	1	ECQP1182FZ	C:FXD FLM	1800PF 1% 100V	26550
C 0027	1	ECCW1H820K5	C:FXD CER TC	82PF +-10% 50V SL	29890
C 0031	1	ECQP1153FZ	C:FXD FLM	0.015UF 1% 100V	26550
C 0032	1	ECQP1153FZ	C:FXD FLM	0.015UF 1% 100V	26550
C 0035	1	ECQP1183FZ	C:FXD FLM	0.018UF 1% 100V	26550
C 0036	1	ECQP1133GZ	C:FXD FLM	0.013UF 2% 100V	26550
C 0037	1	ECQP1133GZ	C:FXD FLM	0.013UF 2% 100V	26550
C 0038	1	ECQP1242FZ	C:FXD FLM	2400PF 1% 100V	26550
C 0039	1	ECQP1242FZ	C:FXD FLM	2400PF 1% 100V	26550
C 0040	1	ECQP1103FZ	C:FXD FLM	0.01UF 1% 100V	26550
C 0042	1	ECCW1H271K5	C:FXD CER TC	270PF +-10% 50V SL	29890

PARTS LIST

A P7681B BPF DWG NO 4G203676

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
C 0043	1	ECQP1183FZ	C:FXD FLM	0.018UF 1% 100V	26550
C 0044	1	ECQP1183FZ	C:FXD FLM	0.018UF 1% 100V	26550
C 0045	1	ECQP1132FZ	C:FXD FLM	1300PF 1% 100V	26550
C 0046	1	ECQP1132FZ	C:FXD FLM	1300PF 1% 100V	26550
C 0047	1	ECCW1H820K5	C:FXD CER TC	82PF +-10% 50V SL	29890
C 0048	1	ECCW1H820K5	C:FXD CER TC	82PF +-10% 50V SL	29890
C 0049	1	ECQP1332FZ	C:FXD FLM	3300PF 1% 100V	26550
C 0050	1	ECQP1122FZ	C:FXD FLM	1200PF 1% 100V	26550
C 0051	1	ECCW1H330K5	C:FXD CER TC	33PF +-10% 50V SL	29890
C 0061	1	ECEA1VU100	C:FXD AL ELECT	10UF +-20% 35V	29880
C 0062	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29880
C 0063	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29880
C 0064	1	ECCW1H331K5	C:FXD CER TC	330PF +-10% 50V SL	29890
C 0065	1	ECCW1H560K5	C:FXD CER TC	56PF +-10% 50V SL	29890
C 0066	1	ECCW1H820K5	C:FXD CER TC	82PF +-10% 50V SL	29890
C 0067	1	ECCW1H820K5	C:FXD CER TC	82PF +-10% 50V SL	29890
C 0068	1	ECQP1152FZ	C:FXD FLM	1500PF 1% 100V	26550
C 0069	1	ECCW1H101K5	C:FXD CER TC	100PF +-10% 50V SL	29890
C 0070	1	ECCW1H101K5	C:FXD CER TC	100PF +-10% 50V SL	29890
E 0001	1	2G400718	PCB,BPF	P7681B	ORGNL
L 0001	1	4G431279-1	COIL (7)	P7681B BPF	ORGNL
L 0003	1	4G431281-1	COIL (9)	P7681B BPF	ORGNL
L 0005	1	4G431275-1	COIL (3)	P7681B BPF	ORGNL
L 0006	1	4G431273-1	COIL (1)	P7681B BPF	ORGNL

0143

PARTS LIST

A P7681B BPF DWG NO 4G203676

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
L 0007	1	4G431280-1	COIL (8)	P7681B BPF	ORGNL
L 0008	1	4G431278-1	COIL (6)	P7681B BPF	ORGNL
L 0009	1	4G431276-1	COIL (4)	P7681B BPF	ORGNL
L 0010	1	4G431276-1	COIL (4)	P7681B BPF	ORGNL
L 0011	1	4G431274-1	COIL (2)	P7681B BPF	ORGNL
L 0012	1	4G431277-1	COIL (5)	P7681B BPF	ORGNL
Q 0001	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
R	1	EROS2TKF1152	R:FXD MET FLM	11.5K OHM 1% 1/4W	29860
R 0001	1	EROS2TKF6040	R:FXD MET FLM	604 OHM 1% 1/4W	29860
R 0002	1	EROS2TKF2000	R:FXD MET FLM	200 OHM 1% 1/4W	29860
R 0003	1	EROS2TKF2000	R:FXD MET FLM	200 OHM 1% 1/4W	29860
R 0004	1	EROS2TKF8060	R:FXD MET FLM	806 OHM 1% 1/4W	29860
R 0005	1	EROS2TKF6040	R:FXD MET FLM	604 OHM 1% 1/4W	29860
R 0006	1	EROS2TKF4751	R:FXD MET FLM	4.75K OHM 1% 1/4W	29860
R 0008	1	EROS2TKF6040	R:FXD MET FLM	604 OHM 1% 1/4W	29860
R 0009	1	EROS2TKF6040	R:FXD MET FLM	604 OHM 1% 1/4W	29860
R 0010	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R 0011	1	ERD25TJ470V	R:FXD CARBON	47 OHM 5% 1/4W	29860
R 0012	1	ERD25TJ470V	R:FXD CARBON	47 OHM 5% 1/4W	29860
U 0001	1	UPC159A	IC:OP AMP		12167

0144

PARTS LIST

A P7681B FM OSC/O DWG NO 4G203677

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
C	3	ECCW1H330KC5	C:FXD CER TC	33PF +-10% 50V NPO	29890
C	1	ECQP1102FZ	C:FXD FLM	1000PF 1% 100V	26550
C 0001	1	ECEA1HU2R2	C:FXD AL ELECT	2.2UF +-20% 50V	29880
C 0002	1	ECEA1CU470	C:FXD AL ELECT	47UF +-20% 16V	29880
C 0003	1	ECEA1CU470	C:FXD AL ELECT	47UF +-20% 16V	29880
C 0004	1	DM15D681F3	C:FXD MICA	680PF 1% 300V	12440
C 0005	1	DM15D681F3	C:FXD MICA	680PF 1% 300V	12440
C 0006	1	ECQM1H103KZ	C:FXD FLM	0.01UF 10% 50V	26550
C 0007	1	DM15D681F3	C:FXD MICA	680PF 1% 300V	12440
C 0008	1	ECCW1H101KC5	C:FXD CER TC	100PF +-10% 50V NPO	29890
C 0009	1	ECCW1H271KC5	C:FXD CER TC	270PF +-10% 50V NPO	29890
C 0010	1	DM15C470J5	C:FXD MICA	47PF 5% 500V	12440
C 0011	1	DM15D681F3	C:FXD MICA	680PF 1% 300V	12440
C 0012	1	ECEA1CU470	C:FXD AL ELECT	47UF +-20% 16V	29880
C 0013	1	ECEA1CU100	C:FXD AL ELECT	10UF +-20% 16V	29880
C 0014	1	ECEA1CU100	C:FXD AL ELECT	10UF +-20% 16V	29880
C 0015	1	ECEA1CU100	C:FXD AL ELECT	10UF +-20% 16V	29880
C 0016	1	ECEA1CU100	C:FXD AL ELECT	10UF +-20% 16V	29880
C 0017	1	DM15C471J3	C:FXD MICA	470PF 5% 300V	12440
C 0018	1	ECEA1CU470	C:FXD AL ELECT	47UF +-20% 16V	29880
C 0019	1	ECEA1CU470	C:FXD AL ELECT	47UF +-20% 16V	29880
C 0022	1	ECEA1CU100	C:FXD AL ELECT	10UF +-20% 16V	29880
C 0023	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29880
C 0024	1	ECEA1VU101	C:FXD AL ELECT	100UF +-20% 35V	29880
C 0025	1	ECKW1H473ZF5	C:FXD CER HI-K	47000PF +80-20% 50V	29890
C 0026	1	ECEA1CU221	C:FXD AL ELECT	220UF +-20% 16V	29880
C 0027	1	ECKW1H473ZF5	C:FXD CER HI-K	47000PF +80-20% 50V	29890
C 0028	1	ECEA1CU221	C:FXD AL ELECT	220UF +-20% 16V	29880
C 0029	1	ECEA1CU221	C:FXD AL ELECT	220UF +-20% 16V	29880

0145

PARTS LIST

A P7681B FM OSC/O DWG NO 4G203677

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
C 0030	1	ECKW1H473ZF5	C:FXD CER HI-K	47000PF +80-20% 50V	29890
CR 0001	1	MA150TA	DIODE:SI	100MA 35V	29269
CR 0002	1	MA150TA	DIODE:SI	100MA 35V	29269
CR 0003	1	MA150TA	DIODE:SI	100MA 35V	29269
CR 0004	1	MA150TA	DIODE:SI	100MA 35V	29269
E 0001	1	2G400715	PCB,FM OSC	P7681B	ORGNL
L 0001	1	FS1012S302J	COIL:CHOKE	3000UH 5%	13977
L 0002	1	FS1012S302J	COIL:CHOKE	3000UH 5%	13977
Q 0001	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269
Q 0002	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269
Q 0003	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0004	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269
Q 0005	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0006	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0007	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0008	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0009	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
R 0001	1	ERDS2TKF1002	R:FXD MET FLM	10.0K OHM 1% 1/4W	29860
R 0002	1	ERDS2TKF1472	R:FXD MET FLM	14.7K OHM 1% 1/4W	29860

PARTS LIST

A P7681B FM OSC/O DWG NO 4G203677

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R	0003	1	A14H4237B502	R:VAR CARBON	5K OHM 20% 3/4W	16551
R	0004	1	ER0S2TKF1002	R:FXD MET FLM	10.0K OHM 1% 1/4W	29860
R	0005	1	ER0S2TKF8252	R:FXD MET FLM	82.5K OHM 1% 1/4W	29860
R	0006	1	ER0S2TKF1002	R:FXD MET FLM	10.0K OHM 1% 1/4W	29860
R	0007	1	ER0S2TKF8251	R:FXD MET FLM	8.25K OHM 1% 1/4W	29860
R	0008	1	ER0S2TKF1001	R:FXD MET FLM	1K OHM 1% 1/4W	29860
R	0009	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R	0010	1	A14H4237B502	R:VAR CARBON	5K OHM 20% 3/4W	16551
R	0011	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W	29860
R	0012	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W	29860
R	0013	1	A14H4237B502	R:VAR CARBON	5K OHM 20% 3/4W	16551
R	0014	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R	0015	1	ERD25TJ471V	R:FXD CARBON	470 OHM 5% 1/4W	29860
R	0016	1	ERD25TJ471V	R:FXD CARBON	470 OHM 5% 1/4W	29860
R	0017	1	ERD25TJ273V	R:FXD CARBON	27K OHM 5% 1/4W	29860
R	0018	1	ERD25TJ224V	R:FXD CARBON	220K OHM 5% 1/4W	29860
R	0019	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0020	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W	29860
R	0021	1	ERD25TJ182V	R:FXD CARBON	1.8K OHM 5% 1/4W	29860
R	0022	1	ERD25TJ182V	R:FXD CARBON	1.8K OHM 5% 1/4W	29860
R	0023	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29860
R	0024	1	ERD25TJ431V	R:FXD CARBON	430 OHM 5% 1/4W	29860
R	0025	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29860
R	0026	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0027	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W	29860
R	0028	1	ER0S2TKF6811	R:FXD MET FLM	6.81K OHM 1% 1/4W	29860
R	0029	1	ER0S2TKF6811	R:FXD MET FLM	6.81K OHM 1% 1/4W	29860
R	0030	1	ER0S2TKF5232	R:FXD MET FLM	52.3K OHM 1% 1/4W	29860
R	0031	1	ER0S2TKF5232	R:FXD MET FLM	52.3K OHM 1% 1/4W	29860
R	0032	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29860

0147

PARTS LIST

A P7681B FM OSC/O DWG NO 4G203677

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R	0033	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0034	1	ERD25TJ183V	R:FXD CARBON	18K OHM 5% 1/4W	29860
R	0035	1	ERD25TJ474V	R:FXD CARBON	470K OHM 5% 1/4W	29860
R	0036	1	ERD25TJ474V	R:FXD CARBON	470K OHM 5% 1/4W	29860
R	0037	1	ERD25TJ104V	R:FXD CARBON	100K OHM 5% 1/4W	29860
R	0038	1	ERD25TJ104V	R:FXD CARBON	100K OHM 5% 1/4W	29860
R	0039	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0040	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W	29860
R	0041	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
R	0042	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
R	0043	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0044	1	ERD25TJ512V	R:FXD CARBON	5.1K OHM 5% 1/4W	29860
U	0001	1	UPC251C	IC:OP AMP		12167
U	0002	1	UPC159A	IC:OP AMP		12167
U	0003	1	UPC251C	IC:OP AMP		12167
U	0004	1	UPC271C	IC:COMPARATOR		12167
U	0005	1	UPC271C	IC:COMPARATOR		12167
U	0006	1	SN74LS90N	IC:TTL LS	DECADE COUNTER	14558
U	0007	1	SN7449ON	IC:TTL	DUAL DECADE COUNTER	14558
U	0008	1	MC4044P	IC:TTL	FREQ DETECTOR	13964
U	0009	1	SN76514N	IC:TTL	DOUBLE BALANCED MIXER	14558
U	0010	1	UPC159A	IC:OP AMP		12167
U	0011	1	UPC151C	IC:OP AMP		12167

PARTS LIST

A P7681B MATRIX DWG NO 4G203678

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
C	0801	1	ECEA1CU100	C:FXD AL ELECT	10UF +-20% 16V	29880
C	0802	1	ECEA1CU100	C:FXD AL ELECT	10UF +-20% 16V	29880
C	0803	1	ECEA1CU470	C:FXD AL ELECT	47UF +-20% 16V	29880
C	0804	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29880
C	0805	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29880
C	0806	1	ECKF1H473ZV	C:FXD CER HI-K	0.047UF +80%-20% 50V	29890
C	0807	1	ECKF1H473ZV	C:FXD CER HI-K	0.047UF +80%-20% 50V	29890
C	0808	1	ECKF1H473ZV	C:FXD CER HI-K	0.047UF +80%-20% 50V	29890
C	0809	1	ECKF1H473ZV	C:FXD CER HI-K	0.047UF +80%-20% 50V	29890
C	0810	1	ECKF1H473ZV	C:FXD CER HI-K	0.047UF +80%-20% 50V	29890
CR	0801	1	MA150TA	DIODE:SI	100MA 35V	29269
E	0001	1	2G401475	PCB,MATRIX	P7681B	ORGNL
Q	0801	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269
Q	0802	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269
Q	0803	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269
R		1	ERD50TJ4R7	R:FXD CARBON	4.7 OHM 5% 1/2W	29860
R	0801	1	ERD25TJ224V	R:FXD CARBON	220K OHM 5% 1/4W	29860
R	0802	1	ERD25TJ274V	R:FXD CARBON	270K OHM 5% 1/4W	29860
R	0803	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R	0804	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W	29860
R	0805	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860

0149

PARTS LIST

A P7681B MATRIX DWG NO 4G203678

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R	0806	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W	29860
R	0807	1	ERD25TJ562V	R:FXD CARBON	5.6K OHM 5% 1/4W	29860
R	0810	1	EXBP88222K	R:NETWORK	2.2K OHM X8 10% 1/8W	29860
R	0811	1	EXBP88222K	R:NETWORK	2.2K OHM X8 10% 1/8W	29860
U		5	SN74LS11N	IC:TTL LS	TRIPLE 3-INPUT AND GATE	14558
U	0803	1	SN74LS123N	IC:TTL LS	DUAL MONO MULTIVIBRATOR	14558
U	0804	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U	0805	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U	0806	1	SN74LS04N	IC:TTL LS	HEX INVERTER	14558
U	0808	1	SN74LS08N	IC:TTL LS	QUAD 2-INPUT AND GATE	14558
U	0810	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U	0811	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U	0812	1	SN74LS10N	IC:TTL LS	TRIPLE 3-INPUT NAND GATE	14558
U	0813	1	SN74LS20N	IC:TTL LS	DUAL 4-INPUT NAND GATE	14558
U	0814	1	SN74LS01N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U	0815	1	SN74LS01N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U	0816	1	SN74LS01N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U	0817	1	SN74LS01N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U	0819	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U	0820	1	SN74LS240N	IC:TTL LS	OCTAL INVERTER 3-STATE	14558

PARTS LIST

A P7681B AM/SYNC DWG NO 4G203679

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
C 0001	1	ECV1ZW20X44	C:VAR CER	22.5PF-2.5PF 250V	29990
C 0002	1	ECCW1H080DC5	C:FXD CER TC	8PF +-0.5PF 50V NPO	29890
C 0003	1	ECCF1H330K	C:FXD CER TC	33PF +-10% 50V SL	29890
C 0004	1	ECV1ZW20X44	C:VAR CER	22.5PF-2.5PF 250V	29990
C 0005	1	ECCW1H080DC5	C:FXD CER TC	8PF +-0.5PF 50V NPO	29890
C 0006	1	ECCF1H470JC	C:FXD CER TC	47PF +-5% 50V NPO	29890
C 0007	1	QS25F3201	C:FXD FLM	3200PF 1% 50V	12956
C 0008	1	QS25F1601	C:FXD FLM	1600PF 1% 50V	12956
C 0009	1	QS25F1601	C:FXD FLM	1600PF 1% 50V	12956
C 0010	1	ECCW1H221KC5	C:FXD CER TC	220PF +-10% 50V NPO	29890
C 0011	1	ECCF1H330K	C:FXD CER TC	33PF +-10% 50V SL	29890
C 0012	1	ECCF1H271K	C:FXD CER TC	270PF +-10% 50V SL	29890
C 0013	1	QS25F2001	C:FXD FLM	2000PF 1% 50V	12956
C 0014	1	QS25F1001	C:FXD FLM	1000PF 1% 50V	12956
C 0015	1	QS25F1001	C:FXD FLM	1000PF 1% 50V	12956
C 0016	1	ECQM1H222KZ	C:FXD FLM	2200PF 10% 50V	26550
C 0017	1	ECQM1H222KZ	C:FXD FLM	2200PF 10% 50V	26550
C 0018	1	ECQM1H222KZ	C:FXD FLM	2200PF 10% 50V	26550
C 0019	1	ECCW1H270KC5	C:FXD CER TC	27PF +-10% 50V NPO	29890
C 0020	1	ECQM1H152KZ	C:FXD FLM	1500PF 10% 50V	26550
C 0021	1	ECQM1H104KZ	C:FXD FLM	0.1UF 10% 50V	26550
C 0022	1	ECKF1H152MB	C:FXD CER HI-K	1500PF +-20% 50V	29890
C 0023	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12956
C 0024	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29880
C 0025	1	ECKW1H472MD5	C:FXD CER HI-K	4700PF +-20% 50V	29890
C 0026	1	ECEA1HU010	C:FXD AL ELECT	1UF +-20% 50V	29880
C 0027	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29880
C 0028	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29880
C 0029	1	ECEA1CU101	C:FXD AL ELECT	100UF +-20% 16V	29880
C 0030	1	ECEA1VU100	C:FXD AL ELECT	10UF +-20% 35V	29880

0151

PARTS LIST

A P7681B AM/SYNC DWG NO 4G203679

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
C 0031	1	ECEA1VU100	C:FXD AL ELECT	10UF +-20% 35V	29880
C 0032	1	ECEA1VU100	C:FXD AL ELECT	10UF +-20% 35V	29880
C 0033	1	ECEA1VU100	C:FXD AL ELECT	10UF +-20% 35V	29880
C 0034	1	ECEA1VU100	C:FXD AL ELECT	10UF +-20% 35V	29880
C 0035	1	ECCF1H040D	C:FXD CER TC	4PF +-0.5PF 50V SL	29890
CR 0001	1	MA322-MC	DIODE:SI	20MA 30V	29269
CR 0002	1	MA150TA	DIODE:SI	100MA 35V	29269
CR 0003	1	MA150TA	DIODE:SI	100MA 35V	29269
E 0001	1	2G400717	PCB,AM/SYNC	P7681B	ORGNL
L 0001	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
Q 0001	1	2SC1215	TSTR:SI NPN	PC:200MW FT:1200MHZ	29269
Q 0002	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0003	1	2SK30A-Y	TSTR:FET	PC:100MW	17160
Q 0004	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0005	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0006	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0007	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0008	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0009	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0010	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
Q 0011	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ	29269

PARTS LIST

A P7681B AM/SYNC DWG NO 4G203679

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
Q 0012	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ	29269
R 0001	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R 0002	1	ERD25TJ221V	R:FXD CARBON	220 OHM 5% 1/4W	29860
R 0003	1	ERD25TJ182V	R:FXD CARBON	1.8K OHM 5% 1/4W	29860
R 0004	1	ERD25TJ221V	R:FXD CARBON	220 OHM 5% 1/4W	29860
R 0005	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R 0006	1	ERD25TJ221V	R:FXD CARBON	220 OHM 5% 1/4W	29860
R 0007	1	ERD25TJ182V	R:FXD CARBON	1.8K OHM 5% 1/4W	29860
R 0008	1	ERD25TJ221V	R:FXD CARBON	220 OHM 5% 1/4W	29860
R 0009	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R 0010	1	ERD25TJ104V	R:FXD CARBON	100K OHM 5% 1/4W	29860
R 0011	1	A14H4237B104	R:VAR CARBON	100K OHM 20% 3/4W	16551
R 0012	1	ERD25TJ334V	R:FXD CARBON	330K OHM 5% 1/4W	29860
R 0013	1	ERD25TJ104V	R:FXD CARBON	100K OHM 5% 1/4W	29860
R 0014	1	ERD25TJ224V	R:FXD CARBON	220K OHM 5% 1/4W	29860
R 0015	1	ERD25TJ561V	R:FXD CARBON	560 OHM 5% 1/4W	29860
R 0016	1	ERD25TJ221V	R:FXD CARBON	220 OHM 5% 1/4W	29860
R 0017	1	ERD25TJ561V	R:FXD CARBON	560 OHM 5% 1/4W	29860
R 0018	1	ERD25TJ182V	R:FXD CARBON	1.8K OHM 5% 1/4W	29860
R 0019	1	ERD25TJ104V	R:FXD CARBON	100K OHM 5% 1/4W	29860
R 0020	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R 0021	1	ERD25TJ471V	R:FXD CARBON	470 OHM 5% 1/4W	29860
R 0022	1	ERDS2TKF3011	R:FXD MET FLM	3.01K OHM 1% 1/4W	29860
R 0023	1	ERDS2TKF2741	R:FXD MET FLM	2.74K OHM 1% 1/4W	29860
R 0024	1	A14H4237B202	R:VAR CARBON	2K OHM 20% 3/4W	16551
R 0025	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W	29860
R 0026	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860

0153

PARTS LIST

A P7681B AM/SYNC DWG NO 4G203679

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R 0027	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29860
R 0028	1	ERD25TJ681V	R:FXD CARBON	680 OHM 5% 1/4W	29860
R 0029	1	ERD25TJ391V	R:FXD CARBON	390 OHM 5% 1/4W	29860
R 0030	1	ERD25TJ272V	R:FXD CARBON	2.7K OHM 5% 1/4W	29860
R 0031	1	ERD25TJ123V	R:FXD CARBON	12K OHM 5% 1/4W	29860
R 0032	1	ERD25TJ123V	R:FXD CARBON	12K OHM 5% 1/4W	29860
R 0033	1	ERD25TJ272V	R:FXD CARBON	2.7K OHM 5% 1/4W	29860
R 0034	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W	29860
R 0035	1	A14H4237B502	R:VAR CARBON	5K OHM 20% 3/4W	16551
R 0036	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W	29860
R 0037	1	ERD25TJ511V	R:FXD CARBON	510 OHM 5% 1/4W	29860
R 0038	1	ERD25TJ273V	R:FXD CARBON	27K OHM 5% 1/4W	29860
R 0039	1	ERD25TJ153V	R:FXD CARBON	15K OHM 5% 1/4W	29860
R 0040	1	ERD25TJ153V	R:FXD CARBON	15K OHM 5% 1/4W	29860
R 0041	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W	29860
R 0042	1	ERD25TJ224V	R:FXD CARBON	220K OHM 5% 1/4W	29860
R 0043	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R 0044	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R 0045	1	ERDS2TKF1502	R:FXD MET FLM	15.0K OHM 1% 1/4W	29860
R 0046	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R 0047	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W	29860
R 0048	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29860
R 0049	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29860
R 0050	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W	29860
R 0051	1	ERD25TJ561V	R:FXD CARBON	560 OHM 5% 1/4W	29860
R 0052	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29860
R 0053	1	ERD25TJ224V	R:FXD CARBON	220K OHM 5% 1/4W	29860
R 0054	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W	29860
R 0055	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R 0056	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860

PARTS LIST

A P7681B AM/SYNC DWG NO 4G203679

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R 0057	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
R 0058	1	ERD25TJ100V	R:FXD CARBON	10 OHM 5% 1/4W	29860
U 0001	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U 0002	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U 0003	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE	14558
U 0004	1	SN74LS10N	IC:TTL LS	TRIPLE 3-INPUT NAND GATE	14558
U 0005	1	SN74LS04N	IC:TTL LS	HEX INVERTER	14558
U 0006	1	SN7400N	IC:TTL	QUAD 2-INPUT NAND GATE	14558
U 0007	1	SN74LS93N	IC:TTL LS	4-BIT BINARY COUNTER	14558
U 0008	1	SN74LS90N	IC:TTL LS	DECADE COUNTER	14558
U 0009	1	SN74LS90N	IC:TTL LS	DECADE COUNTER	14558
U 0010	1	SN74LS93N	IC:TTL LS	4-BIT BINARY COUNTER	14558
U 0011	1	UPC151C	IC:OP AMP		12167
U 0012	1	SN74LS93N	IC:TTL LS	4-BIT BINARY COUNTER	14558
U 0013	1	SN74LS107AN	IC:TTL LS	DUAL J-K FLIP-FLOP	14558
U 0014	1	SN74LS90N	IC:TTL LS	DECADE COUNTER	14558
U 0015	1	UPC271C	IC:COMPARATOR		12167
U 0016	1	UPC271C	IC:COMPARATOR		12167
U 0017	1	MC4044P	IC:TTL	FREQ DETECTOR	13964
U 0018	1	SN74121N	IC:TTL	MONOSTABLE MULTIVIBRATOR	14558
Y 0001	1	4G461456	CRYSTAL:QUARTZ	4.024320MHZ (HC-6/W)	ORGNL
Y 0002	1	4G461455-1	CRYSTAL:QUARTZ	3.77856 MHZ (HC-61W)	ORGNL
Y 0003	1	4G461457	CRYSTAL:QUARTZ	3.52448MHZ (HC-6/W)	ORGNL

0155

PARTS LIST

A P7681B ATT (75) DWG NO 4G203680

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
E	1	3G401011	PCB,ATT	P7681B	ORGNL
R 0001	1	ERO52TKF25R5	R:FXD MET FLM	25.5 OHM 1% 1/4W	29860
R 0002	1	ERO52TKF2870	R:FXD MET FLM	287 OHM 1% 1/4W	29860
R 0003	1	ERO52TKF49R9	R:FXD MET FLM	49.9 OHM 1% 1/4W	29860
R 0004	1	CFMF8R65	R:FXD MET FLM	8.65 OHM 1% 1/8W	13153
R 0005	1	CFMF8R65	R:FXD MET FLM	8.65 OHM 1% 1/8W	13153
R 0006	1	ERO25CKF2611	R:FXD MET FLM	2.61K OHM 1% 1/4W	29860
R 0007	1	ERO25CKF2611	R:FXD MET FLM	2.61K OHM 1% 1/4W	29860
R 0008	1	CFMF8R65	R:FXD MET FLM	8.65 OHM 1% 1/8W	13153
R 0009	1	ERO52TKF1301	R:FXD MET FLM	1.30K OHM 1% 1/4W	29860
R 0010	1	ERO52TKF1301	R:FXD MET FLM	1.30K OHM 1% 1/4W	29860
R 0011	1	ERO52TKF17R4	R:FXD MET FLM	17.4 OHM 1% 1/4W	29860
R 0012	1	ERO52TKF6650	R:FXD MET FLM	665 OHM 1% 1/4W	29860
R 0013	1	ERO52TKF6650	R:FXD MET FLM	665 OHM 1% 1/4W	29860
R 0014	1	ERO52TKF35R7	R:FXD MET FLM	35.7 OHM 1% 1/4W	29860
R 0015	1	ERO52TKF3320	R:FXD MET FLM	332 OHM 1% 1/4W	29860
R 0016	1	ERO52TKF3320	R:FXD MET FLM	332 OHM 1% 1/4W	29860
R 0017	1	ERO52TKF56R2	R:FXD MET FLM	56.2 OHM 1/4 W	29860
R 0018	1	ERO52TKF2260	R:FXD MET FLM	226 OHM 1% 1/4W	29860
R 0019	1	ERO52TKF2260	R:FXD MET FLM	226 OHM 1% 1/4W	29860
R 0020	1	ERO52TKF1070	R:FXD MET FLM	107 OHM 1% 1/4W	29860
R 0021	1	ERO52TKF1430	R:FXD MET FLM	143 OHM 1% 1/4W	29860
R 0022	1	ERO52TKF1430	R:FXD MET FLM	143 OHM 1% 1/4W	29860
S 0001	1	4G410577	PUSHB SW	P7681B ATT	ORGNL

PARTS LIST

A P7681B MODE SW DWG NO 4G203682

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
DS	0001	1	DTSTLBG	KEY BOARD SW	10MA 25V GREEN	13970
DS	0002	1	DTSTLBG	KEY BOARD SW	10MA 25V GREEN	13970
DS	0003	1	DTSTLBG	KEY BOARD SW	10MA 25V GREEN	13970
DS	0004	1	DTSTLBG	KEY BOARD SW	10MA 25V GREEN	13970
DS	0005	1	DTSTLBG	KEY BOARD SW	10MA 25V GREEN	13970
DS	0006	1	DTSTLBG	KEY BOARD SW	10MA 25V GREEN	13970
DS	0007	1	DTSTLBG	KEY BOARD SW	10MA 25V GREEN	13970
E	0001	1	3G401008	PCB,MOD SW	P7681B	ORGNL
R	0001	1	ERD25TJ391V	R:FXD CARBON	390 OHM 5% 1/4W	29860
R	0002	1	ERD25TJ391V	R:FXD CARBON	390 OHM 5% 1/4W	29860
R	0003	1	ERD25TJ391V	R:FXD CARBON	390 OHM 5% 1/4W	29860
R	0004	1	ERD25TJ391V	R:FXD CARBON	390 OHM 5% 1/4W	29860
R	0005	1	ERD25TJ391V	R:FXD CARBON	390 OHM 5% 1/4W	29860
R	0006	1	ERD25TJ391V	R:FXD CARBON	390 OHM 5% 1/4W	29860
R	0007	1	ERD25TJ391V	R:FXD CARBON	390 OHM 5% 1/4W	29860

0157

PARTS LIST

A P7681B DELAY EQ DWG NO 4G203683

REF	NO	QTY	PART NO	DESCRIPTION		MFR/DBR
C	0001	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12956
C	0002	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12956
C	0003	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12956
C	0004	1	QS25F5000	C:FXD FLM	500PF 1% 50V	12956
C	0005	1	QS25F5000	C:FXD FLM	500PF 1% 50V	12956
C	0006	1	QS25F1001	C:FXD FLM	1000PF 1% 50V	12956
C	0007	1	QS25F1001	C:FXD FLM	1000PF 1% 50V	12956
C	0008	1	QS25F1001	C:FXD FLM	1000PF 1% 50V	12956
C	0009	1	QS25F1001	C:FXD FLM	1000PF 1% 50V	12956
C	0010	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12956
C	0011	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12956
C	0012	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12956
C	0013	1	QS25F5001	C:FXD FLM	5000PF 1% 50V	12956
C	0014	1	QS25F2501	C:FXD FLM	2500PF 1% 50V	12956
E	0001	1	3G401007	PCB,DELAY EQ	P7681B	ORGNL
L	0001	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L	0002	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L	0003	1	FS0810S102K	COIL:CHOKE	1MH 10%	13977
L	0004	1	FS1012S202J	COIL:CHOKE	2000UH 5%	13977
L	0005	1	FS1012S202J	COIL:CHOKE	2000UH 5%	13977
L	0006	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L	0007	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977
L	0008	1	FS1012S512J	COIL:CHOKE	5100UH 5%	13977

PARTS LIST

A P7681B DELAY EQ DWG NO 4G203683

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
R 0001	1	ERD25TJ393V	R:FXD CARBON	39K OHM 5% 1/4W	29860
R 0002	1	ERD25TJ6R8V	R:FXD CARBON	6.8 OHM 5% 1/4W	29860
R 0003	1	ERD25TJ6R8V	R:FXD CARBON	6.8 OHM 5% 1/4W	29860
R 0004	1	ERD25TJ130V	R:FXD CARBON	13 OHM 5% 1/4W	29860
R 0005	1	ERD25TJ393V	R:FXD CARBON	39K OHM 5% 1/4W	29860
S 0001	1	4G410576-1	PUSHB SW	P7681B	ORGNL

0159

PARTS LIST

A P7681B OVERALL DWG NO 4G203687

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
	2	1280510281P	CONNECTOR:PIN	5P STRAIGHT	16356
	2	1280510281S	CONNECTOR:PIN	5P STRAIGHT	16356
	7	2502250179M	CONNECTOR:EDGE	22P SINGLE	16356
	1	2512250169M	CONNECTOR:EDGE	22P DOUBLE	16356
	8	4560735003	POLARIZING KEY	456	16356
	16	50-4010	PC GUIDE	L=90.0MM	17194
AS	1	ESB70702V	PUSHB SW	DPST 3A-250V AC	29870
AS	1	4G410580	PUSHB SW	P7681B LIM/PRE	ORGNL
AS	2	4G410708	SLIDE SW	SL222B4B	ORGNL
AS 0003	1	SLLE62205A	LEVER SW	DC30V 0.3A	11154
AS 0004	1	SLLE62205A	LEVER SW	DC30V 0.3A	11154
AS 0005	1	4G410579	PUSHB SW	P7681B AF FREQ	ORGNL
AS 0006	1	4G410579	PUSHB SW	P7681B AF FREQ	ORGNL
AS 0011	1	4G410578	P7681B PUSHB SW	INPUT SELECT	ORGNL
AS 0015	1	4G410581	P7681A PUSHB SW	METER FUNCTION	ORGNL
C 0001	1	ECKF1H103ZF	C:FXD CER HI-K	10000PF +80-20% 50V	29890
C 0002	1	ECKF1H103ZF	C:FXD CER HI-K	10000PF +80-20% 50V	29890
CR 0001	1	MA150TA	DIODE:SI	100MA 35V	29269
DS 0001	1	LN21	LED	RED	29253

PARTS LIST

A P7681B OVERALL DWG NO 4G203687

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
E	1	CM32	CONNECTOR	PWR JACK 3P	15360
E 0010	1	4G601215-3W	TERMINAL T-10R		ORGNL
E 0011	1	4G601215-3W	TERMINAL T-10R		ORGNL
E 0012	1	4G601216-3W	TERMINAL T-10K		ORGNL
E 0020	1	4G601215-3W	TERMINAL T-10R		ORGNL
E 0021	1	4G601215-3W	TERMINAL T-10R		ORGNL
E 0022	1	4G601216-3W	TERMINAL T-10K		ORGNL
F	2	IEC1AT	FUSE : TIME LAG	1A 250V 20MM	14385
F	1	SN2250	FUSE HOLDER	10A 250V	12352
J	2	M3110S13	CONNECTOR:PIN	10P L:300	16356
J	2	M3310P01	CONNECTOR:PIN	10P STRAIGHT	16356
J	1	57-40240	CONNECTOR	RECEPT 24P	13367
J	1	5724S	CAP:GP-IB CONNE	DUST CAP	13367
J 0001	1	BNC057	CONNECTOR:COAX	BNC PLUG	12573
J 0002	1	BNC057	CONNECTOR:COAX	BNC PLUG	12573
M 0001	1	4G470665	METER	P7681B	ORGNL
MP	2	4G580089-0WB	STRAP		ORGNL
MP	1	4G644260-0GB	TERMINAL EARTH	PROTECTIVE	ORGNL
MP	6	4G760157-1H	SPACER	TERMINAL-A	ORGNL
MP	6	4G760158-1H	SPACER	TERMINAL-B	ORGNL

0161

PARTS LIST

A P7681B OVERALL DWG NO 4G203687

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
P	1	57-30240	CONNECTOR	PLUG 24P	13367
R 0001	1	EVSN2AS15B14	R:VAR COMP	10K OHM 10% 1/2W	29815
R 0002	1	ERD25TJ512V	R:FXD CARBON	5.1K OHM 5% 1/4W	29860
R 0003	1	ERD25TJ681V	R:FXD CARBON	680 OHM 5% 1/4W	29860
R 0004	1	EVSN2AS15B23	R:VAR COMP	2K OHM 10% 1/2W	29815
R 0005	1	ERD25TJ392V	R:FXD CARBON	3.9K OHM 5% 1/4W	29860
R 0006	1	EVSN2AS15B23	R:VAR COMP	2K OHM 10% 1/2W	29815
R 0007	1	EVSN2AS15B13	R:VAR COMP	1K OHM 10% 1/2W	29815
R 0008	1	ERD25TJ681V	R:FXD CARBON	680 OHM 5% 1/4W	29860
R 0009	1	EVSN2AS15B14	R:VAR COMP	10K OHM 10% 1/2W	29815
R 0010	1	ER0S2TKF1001	R:FXD MET FLM	1K OHM 1% 1/4W	29860
R 0011	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W	29860
R 0012	1	EVSN2AS15B14	R:VAR COMP	10K OHM 10% 1/2W	29815
R 0013	1	ER0S2TKF6810	R:FXD MET FLM	681 OHM 1% 1/4W	29860
R 0014	1	ERD25TJ182V	R:FXD CARBON	1.8K OHM 5% 1/4W	29860
R 0015	1	EVSN2AS15B13	R:VAR COMP	1K OHM 10% 1/2W	29815
R 0016	1	EVSN2AS15B13	R:VAR COMP	1K OHM 10% 1/2W	29815
R 0017	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
R 0018	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W	29860
T 0001	1	3G430321	TRANSFORMER	P8260A PWR	ORGNL
TB	2	78M19-ST5	LUG TERMINAL	1P	11010

PARTS LIST

A P7681B OVERALL DWG NO 4G203687

REF NO	QTY	PART NO	DESCRIPTION	MFR/DBR
W 0001	1	77W02	CABLE:PWR (UL/C 125V 10A	15360

0163

PARTS LIST

A P7681B MECHA DWG NO 4G302110

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
A	8	4G601008-0W	HOLDER ASSY D6	P054V	ORGNL
MM 0047	1	MJP7681B-0	OP MANUAL		10177
MP	1	R76K-B312250	BUSHING-B312-25		13197
MP	1	R76K-SR5P4	BUSHING-SR-5P-4		13197
MP	1	R76W-60743C	BAND:POWER CORD		13197
MP	1	2G580502-0D	COVER/UPPER	P7702C	ORGNL
MP	1	2G580503-0D	COVER/LOWER	P7702C	ORGNL
MP	1	2G580505-1FH	PLATE/REAR	P7681B	ORGNL
MP	1	2G590503-0FB	CHASSIS	P7681B	ORGNL
MP	1	2G630502-0AH	PANEL	P7681B	ORGNL
MP	1	2G660502-0AF	FRAME/FRONT	P7681B	ORGNL
MP	1	3G550525-0N	*STAND:FULL		ORGNL
MP	1	3G590501-0FB	SEPARATOR	P7681B	ORGNL
MP	1	3G613001-0DB	PLT:SHIELD/PWR	P7681B	ORGNL
MP	1	3G670503-0AF	EXTRUSION/RH	P7681B	ORGNL
MP	1	3G670504-0AF	EXTRUSION/LH	P7681B	ORGNL
MP	1	3G710402-0N	BAG PACKING	P9551A	ORGNL
MP	6	3G760041-0C	PUSHBUTTON/5X6	GREEN	ORGNL
MP	12	3G760042-0C	PUSHBUTTON/5X6	BLACK	ORGNL
MP	1	3G760595-0S	JOINT:POWER SW		ORGNL
MP	1	4G550009-0E	HANDLE/MIDDLE		ORGNL
MP	2	4G550020-0FF	HOLDER:HANDLE-M	P5250A	ORGNL
MP	6	4G615361-1CB	BRACKET:SW	P7632A	ORGNL
MP	2	4G615430-0PB	NUT	P8800G	ORGNL
MP	2	4G615540-1CB	HEAT:SINK	P7680A	ORGNL

PARTS LIST

A P7681B MECHA DWG NO 4G302110

REF NO	QTY	PART NO	DESCRIPTION		MFR/DBR
MP	1	4G616506-0AB	PLATE:SHIELD	P7681B	ORGNL
MP	1	4G616709-0LB	BAND,D6		ORGNL
MP	4	4G644138-3AB	3X20	SPACER	ORGNL
MP	5	4G644143-1BB	STUD 3X7	P549A	ORGNL
MP	6	4G644153-2BB	3X10	STUD	ORGNL
MP	2	4G670501-0AF	FRAME,REAR	P7702C	ORGNL
MP	1	4G702230-3E	ROD:POWER	P8811A	ORGNL
MP	1	4G712047-0N	BAG:PACKING	P9549A	ORGNL
MP	1	4G712649-0N	BAG:ACCESSORY	PLAIN	ORGNL
MP	4	4G760073-0G	FOOT	P544P	ORGNL
MP	2	4G760754-0G	*FOOT,RECT-RH		ORGNL
MP	2	4G760755-0G	*FOOT,RECT-LH		ORGNL
MP	8	4G760756-0G	*RUBBER:FOOT	RECTANGULAR	ORGNL

VP-7681B CIRCUIT DIAGRAMS

- OVERALL INTERCONNECTION (A1) ---------- 1
- PREAMP / LPF (A2) ---------- 2
- LIMITER (A3) ---------- 3
- DELAY LINE (A4) ---------- 4
- AF / MAIN (A5) ---------- 5
- BPF (A6) ---------- 6
- FM OSC / ΦD (A7) ---------- 7
- MATRIX (A8) ---------- 8
- AM / SYNC (A9) ---------- 9
- ATTENUATOR (A10) ---------- 10
- INPUT SELECTOR (A11) ---------- 11
- MODE SWITCH (A12) ---------- 12
- POWER SUPPLY (A13) ---------- 13
- DELAY EQUALIZER (A14) ---------- 14
- OUTPUT / METER SELECTOR (A15) ---------- 15
- REMOTE CONTROL (A16) ---------- 16

NOTES

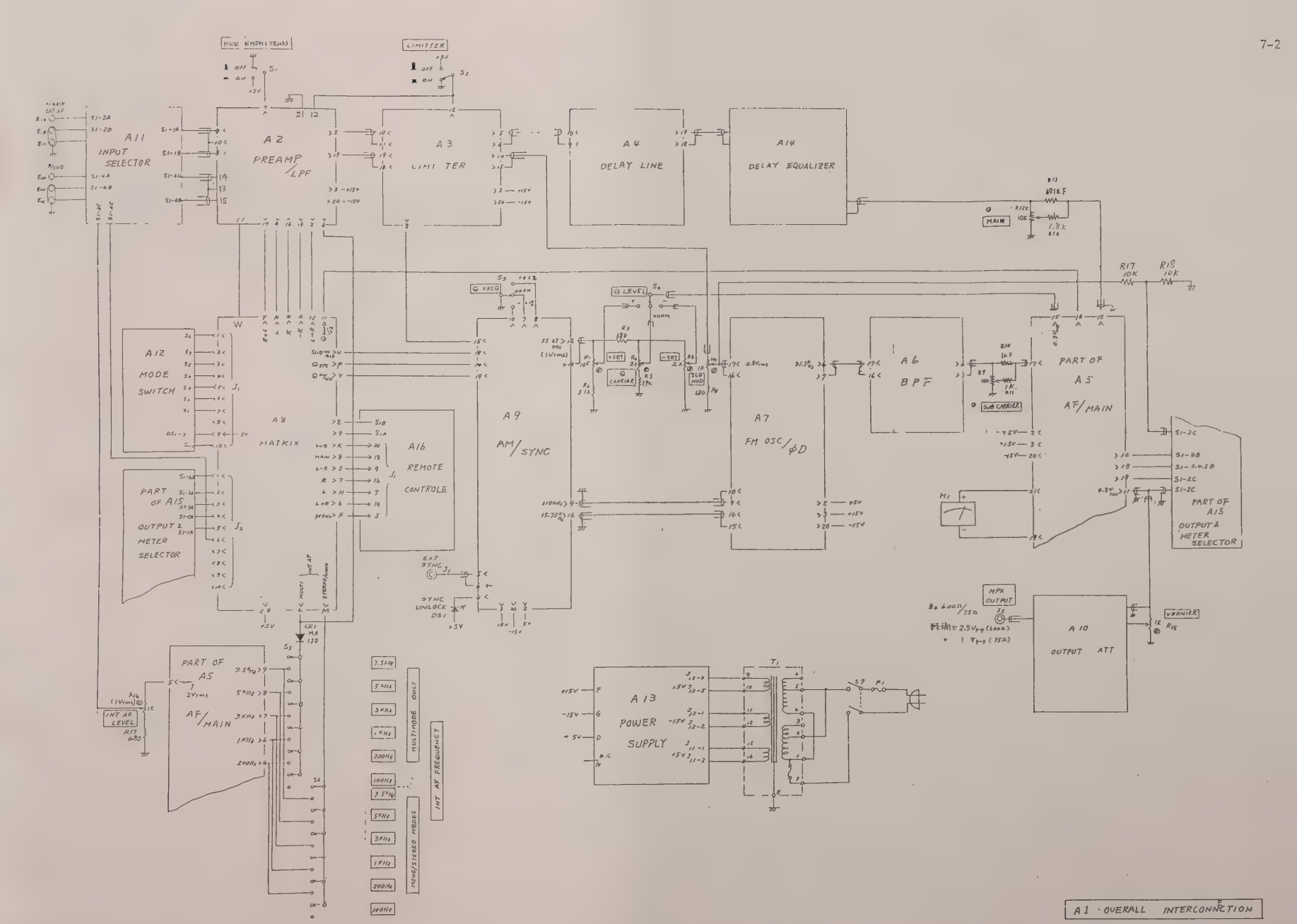
▷ WHEN THE CIRCUIT IS DIVIDED INTO SOME UNITS AND AN IDENTIFYING NUMBER IS ASSIGNED TO EACH UNIT, REFERENCE DESIGNATORS IN EACH CIRCUIT DIAGRAM ARE GIVEN IN ABBREVIATED FORM. PREFIX WITH EACH IDENTIFYING NUMBER FOR COMPLETE DESCRIPTION.
EXAMPLES; A1C1, A6R3.

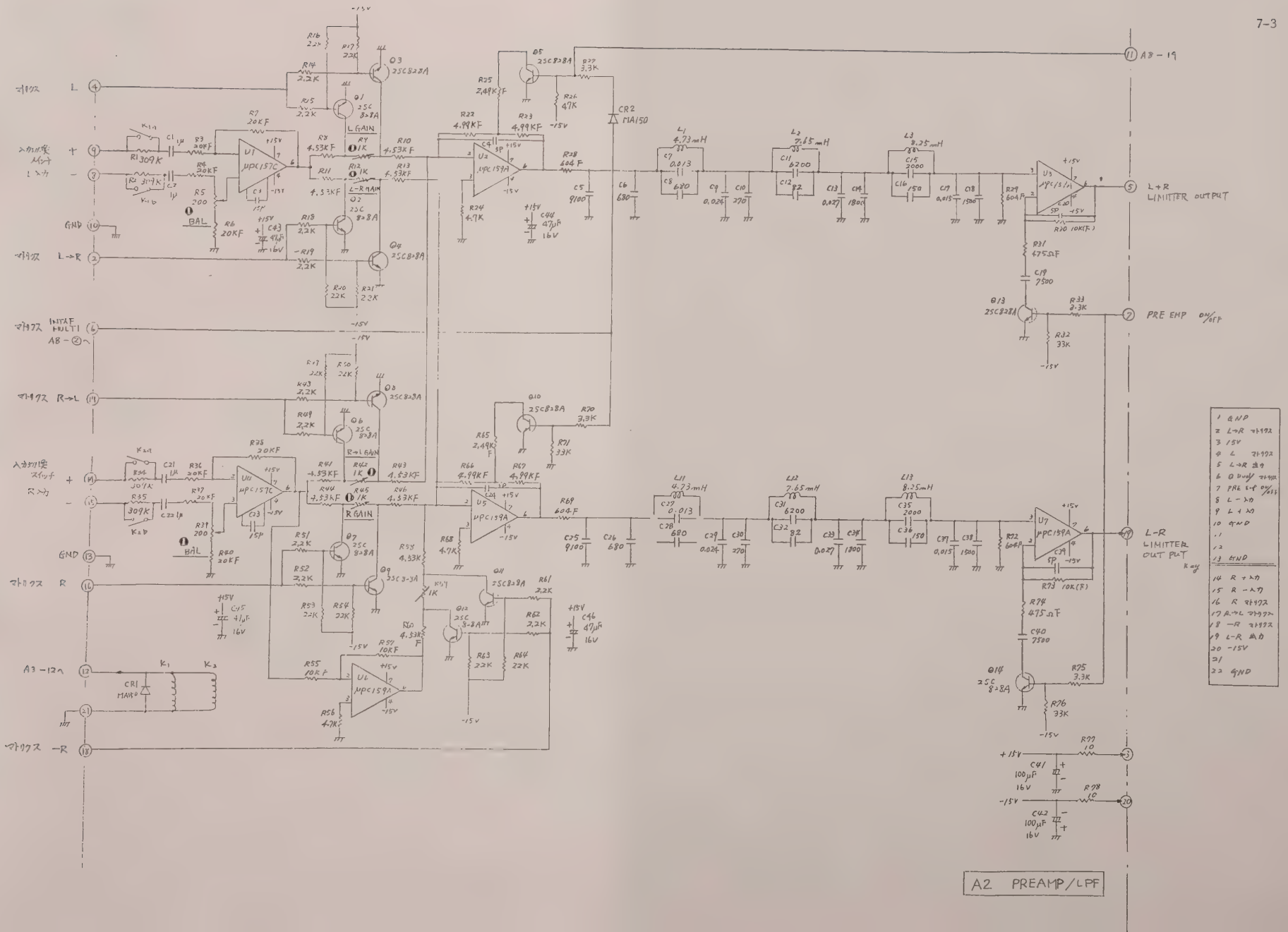
▷ RESISTANCE VALUES IN OHMS AND CAPACITANCE IN PICOFARADS(FROM 1 TO 9,999) OR MICROFARADS (FROM 0.01 TO 0.99) UNLESS OTHERWISE NOTED.

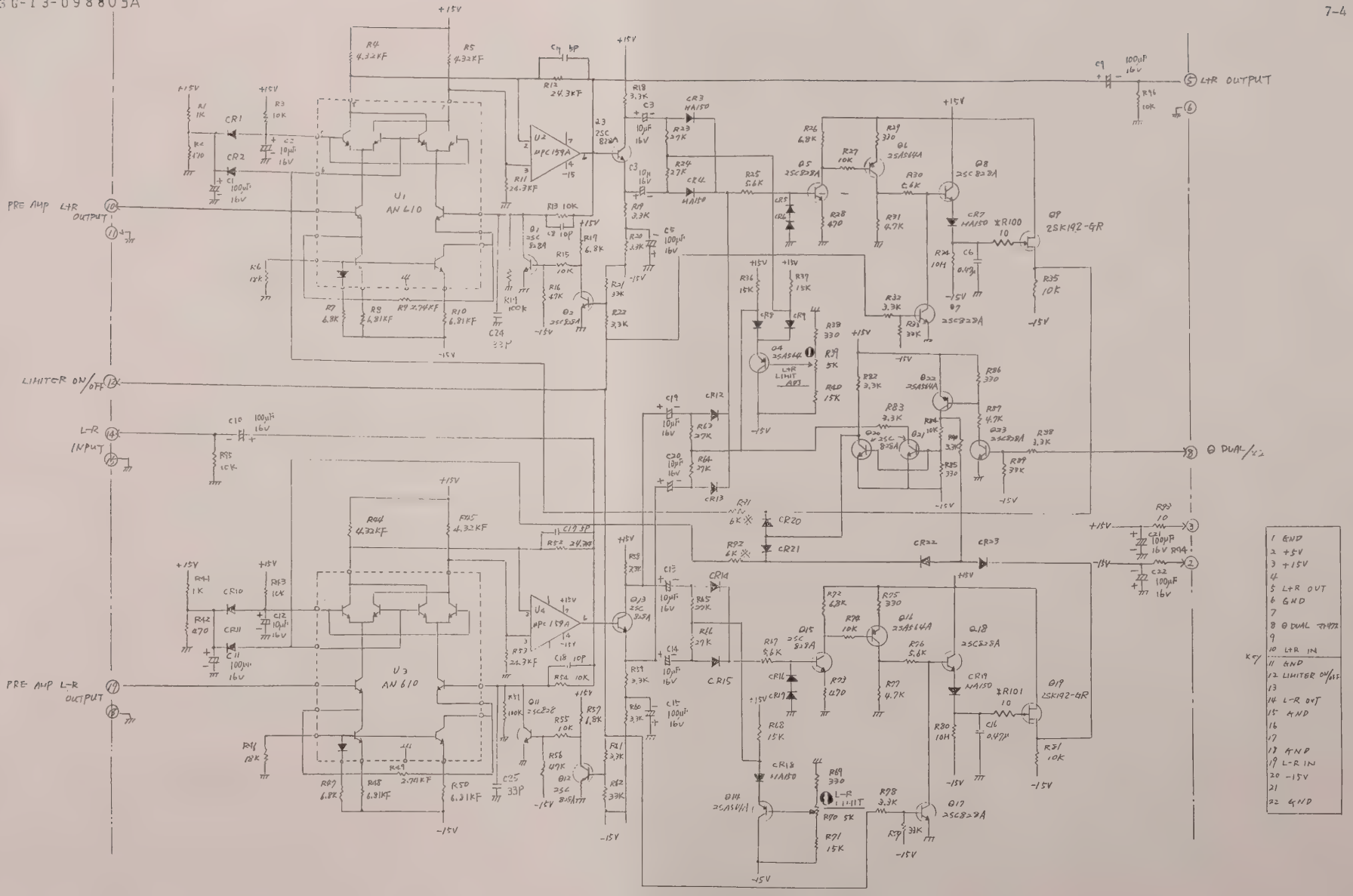
▷ POWER RATINGS AND RESISTANCE TOLERANCES OF FIXED RESISTORS ARE 1/8 WATTS AND ±5 % UNLESS OTHERWISE NOTED.

▷ ✡ FACTORY REWORKED OR CHECKED COMPONENTS.

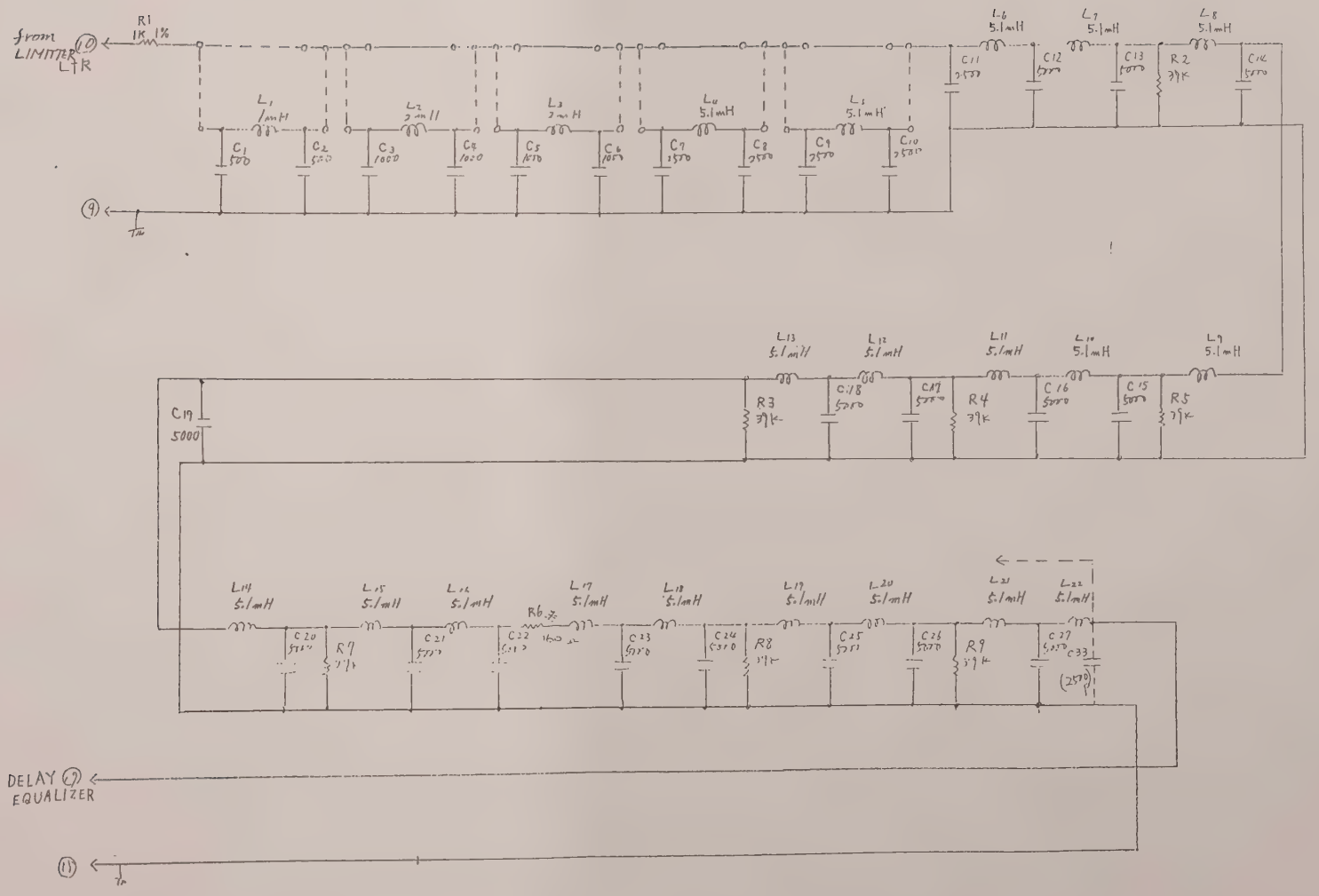
▷ ※ VALUE SELECTED AT FACTORY, NOMINAL VALUE SHOWN.


PRE EMPH (75μS)
LIMITTER
A1 INPUT SELECTOR
A2 PREAMP / LPF
A3 LIMITER
A4 DELAY LINE
A14 DELAY EQUALIZER
A12 MODE SWITCH
A8 MATRIX
A9 AM/SYNC
A16 REMOTE CONTROLE
A7 FM OSC/φD
A6 BPF
PART OF A5 AF/MAIN
PART OF A15 OUTPUT & METER SELECTOR
A10 OUTPUT ATT
A13 POWER SUPPLY
MPX OUTPUT
EXT SYNC
SYNC UNLOCK DS1
INT AF LEVEL
MULTIMODE ONLY
MONO/STEREO MODES
INT AF FREQUENCY
A1 · OVERALL INTERCONNECTION

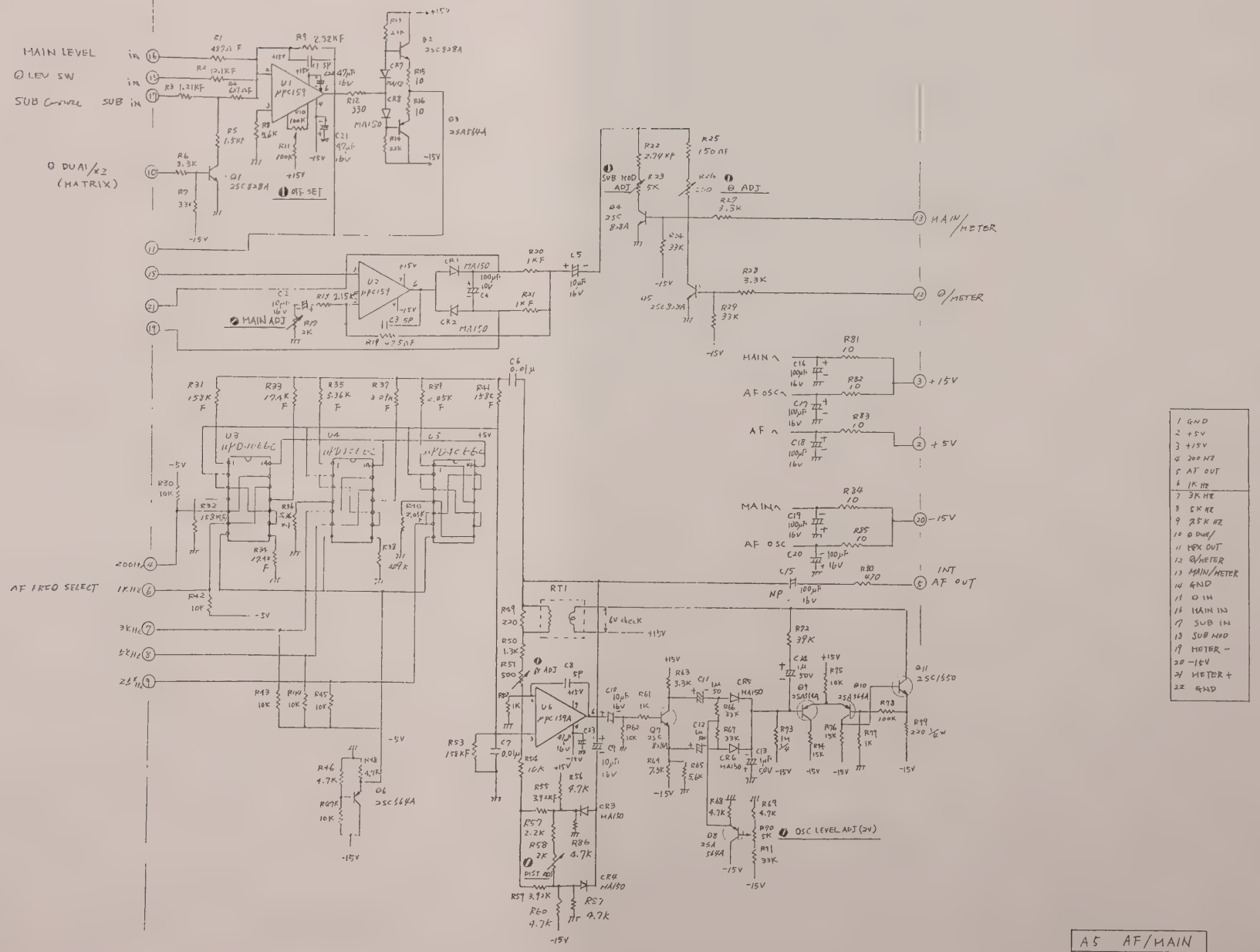

A2 PREAMP/LPF
L+R LIMITTER OUTPUT
PRE EMP ON/OFF
L-R LIMITTER OUT PUT
GND
BAL
L GAIN
R GAIN
CR1 MA150
μPC157C
μPC158A
μPC159A
2SC828A
1 GND
2 L→R マトリクス
3 15V
4 L マトリクス
5 L+R 出力
6 ロウカット スイッチ
7 PRE EMP ON/OFF
8 L 入力
9 L 入力
10 GND
11
12
13 GND
14 R 入力
15 R 入力
16 R マトリクス
17 R→L マトリクス
18 −R マトリクス
19 L-R 出力
20 −15V
21
22 GND


+15V
-15V
PRE AMP L+R OUTPUT
LIMITER ON/OFF
L+R INPUT
PRE AMP L-R OUTPUT
L+R OUTPUT
Θ DUAL
U1 AN 610
U2 μPC 157A
U3 AN 610
U4 μPC 157A
L+R LIMIT ADJ
L-R LIMIT ADJ
1 GND
2 +5V
3 +15V
5 L+R OUT
6 GND
8 Θ DUAL
10 L+R IN
11 GND
12 LIMITER ON/OFF
14 L-R OUT
15 GND
17 GND
19 L-R IN
20 -15V
22 GND
KEY

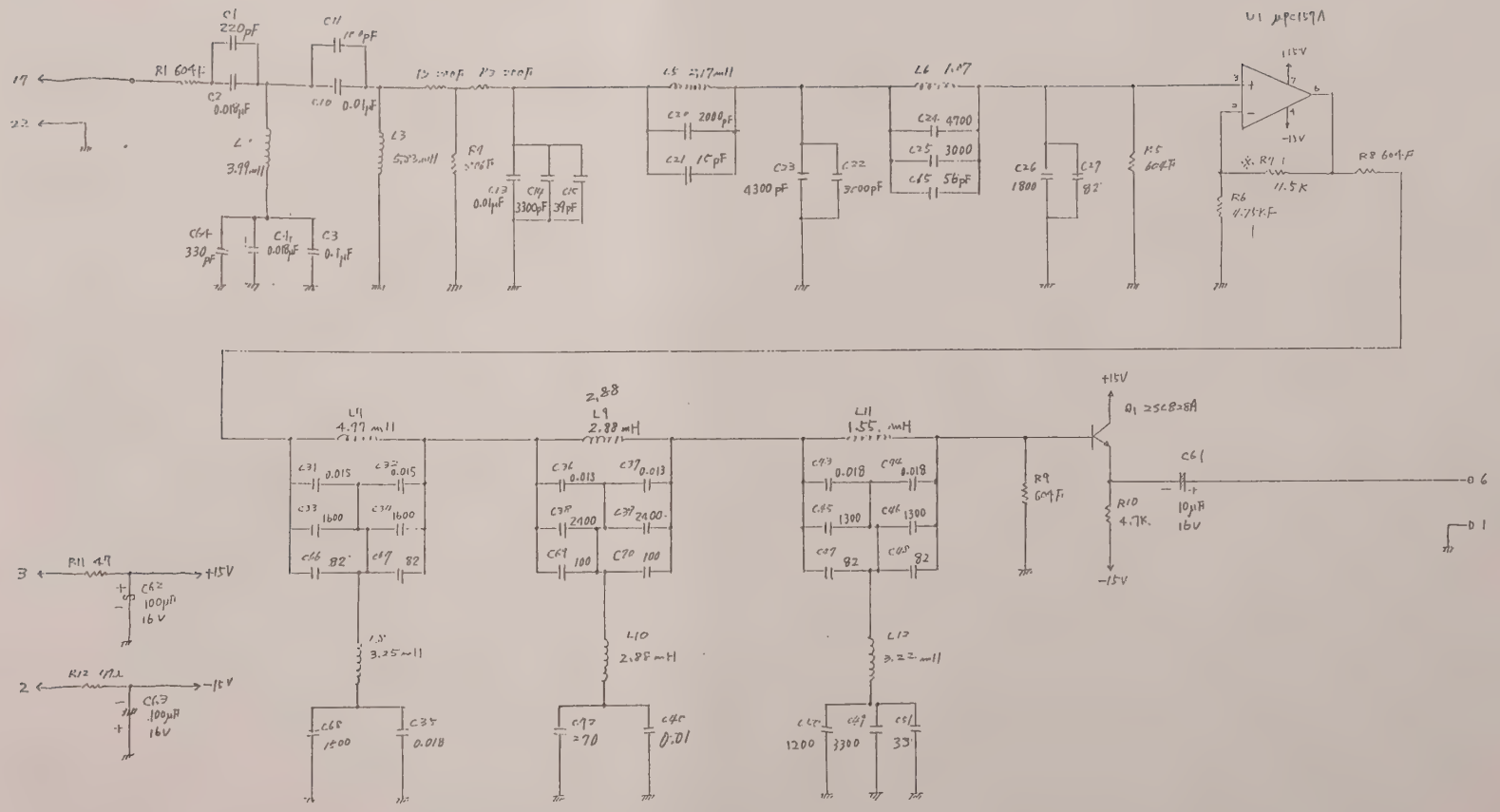
A3 LIMITER

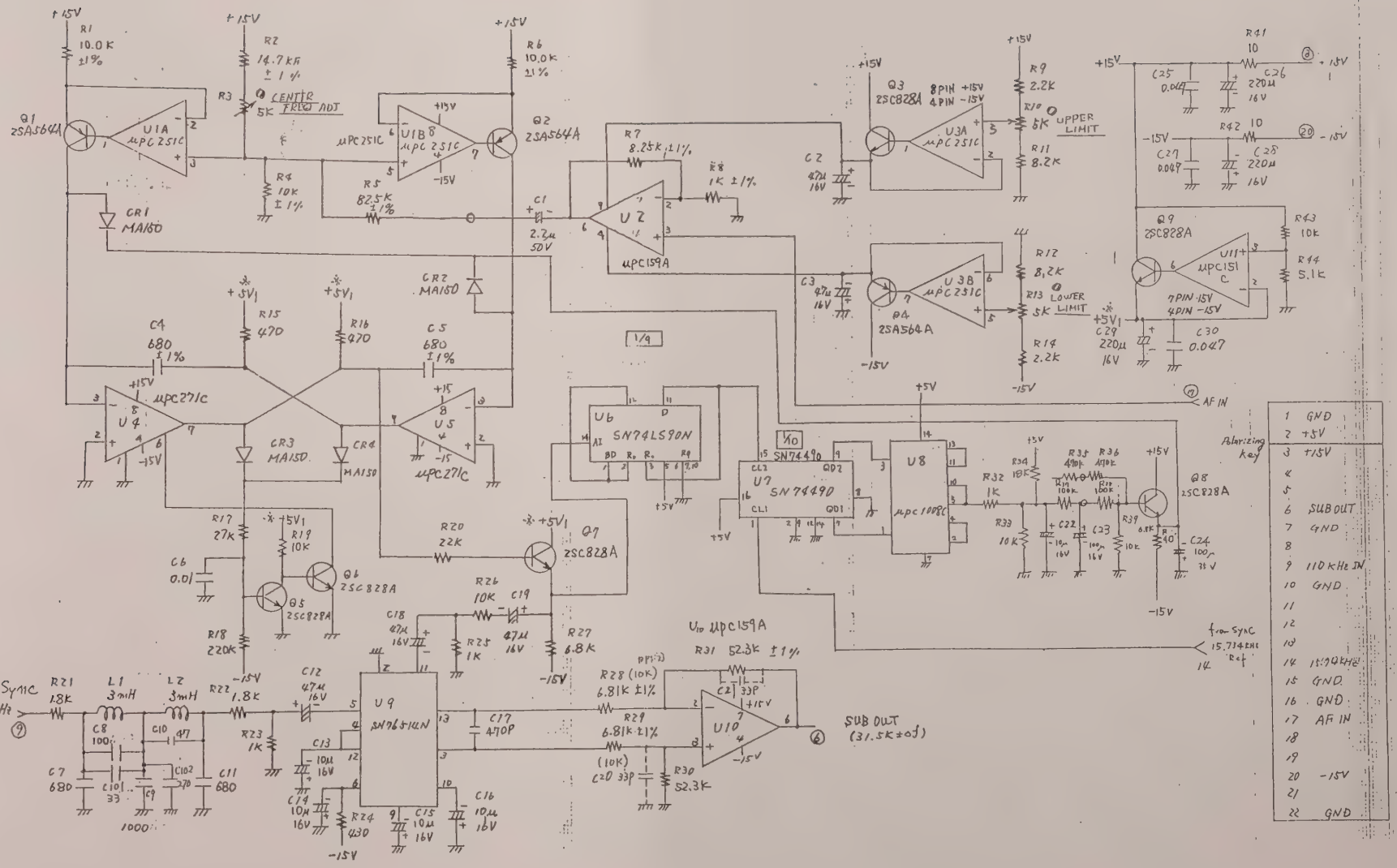


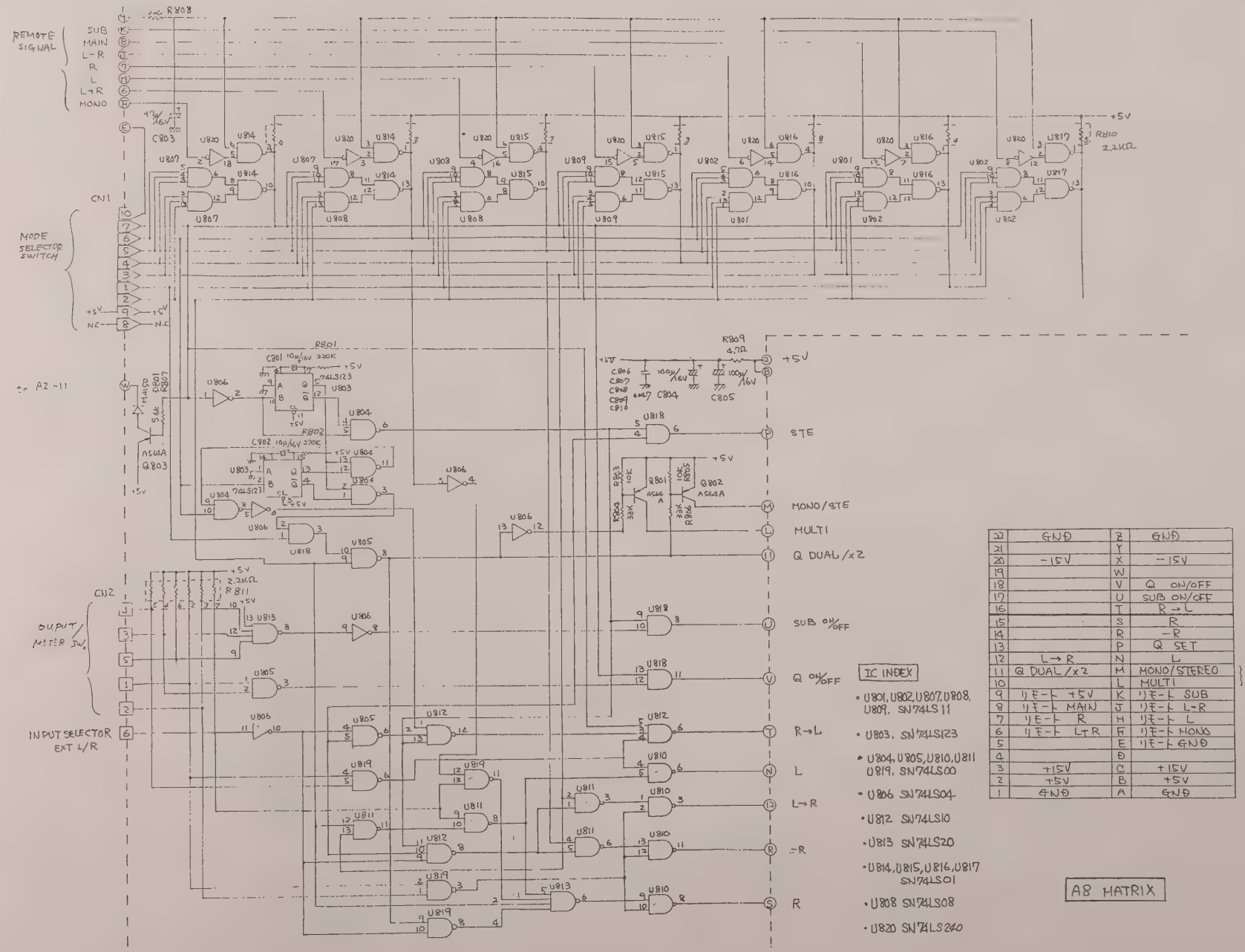
A4 DELAY LINE


MAIN LEVEL
Q LEV SW
SUB Control
SUB in
Q DUAL/X2 (MATRIX)
OFF SET
MAIN ADJ
SUB MOD ADJ
Q ADJ
MAIN/METER
Q/METER
INT AF OUT
AF FREQ SELECT
OSC LEVEL ADJ (2V)
DIST ADJ
BY ADJ
1 GND
2 +5V
3 +15V
4 200 HZ
5 AF OUT
6 1K HZ
7 3K HZ
8 5K HZ
9 25K HZ
10 Q DUAL
11 MPX OUT
12 Q/METER
13 MAIN/METER
14 GND
15 Q IN
16 MAIN IN
17 SUB IN
18 SUB MOD
19 METER -
20 -16V
21 METER +
22 GND

A5 AF/MAIN


A6 BPF


A7 FM OSC/ΦD
CENTER FREQ ADJ
UPPER LIMIT
LOWER LIMIT
from Sync 110kHz IN
SUB OUT (31.5K±0f)
AF IN
from Sync 15.714kHz Ref
Polarizing key
1 GND
2 +5V
3 +15V
6 SUB OUT
7 GND
9 110kHz IN
10 GND
14 15.714kHz
15 GND
16 GND
17 AF IN
20 -15V
22 GND



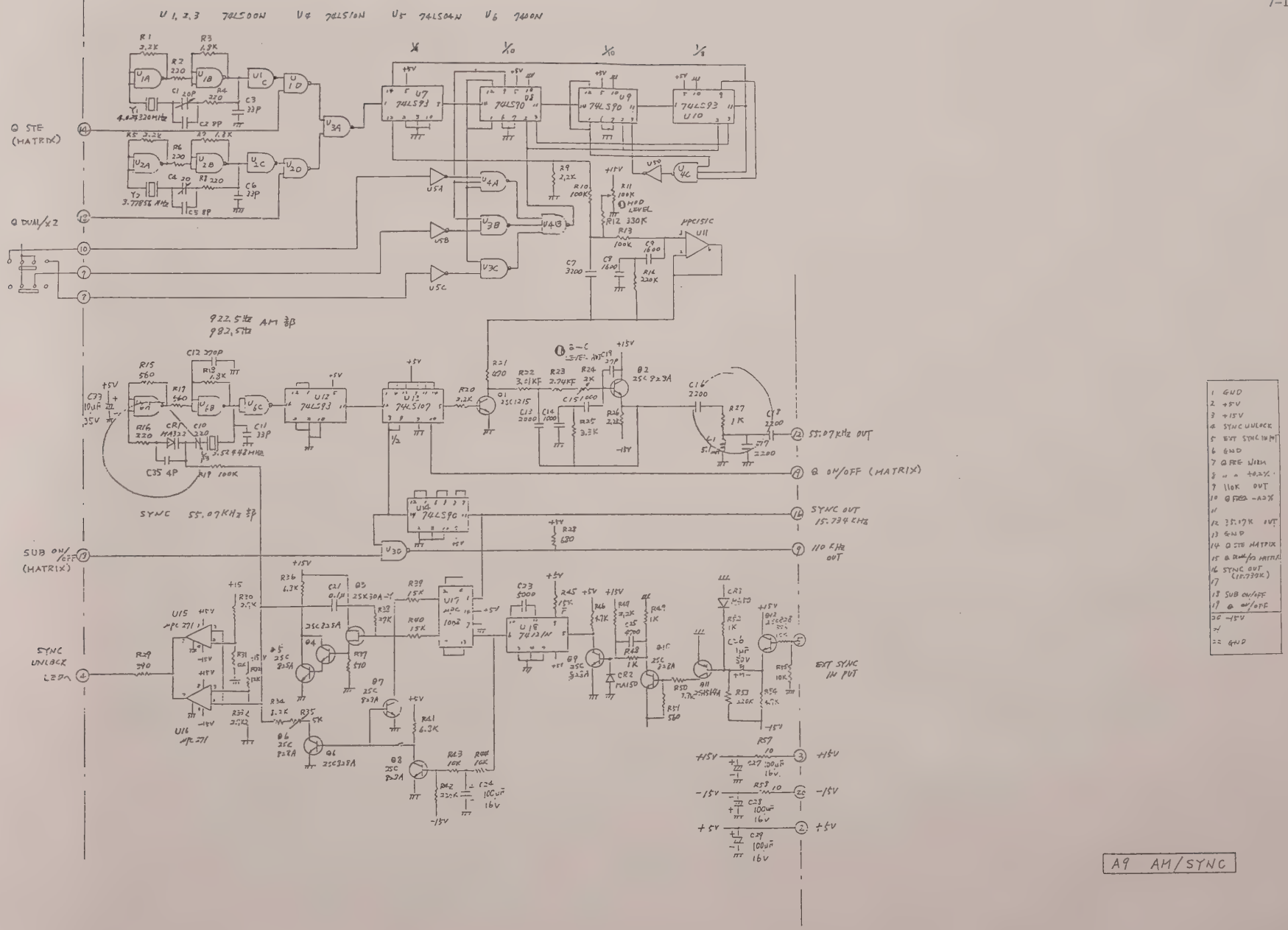
22	GND	Z	GND
21		Y	
20	-15V	X	-15V
19		W	
18		V	Q ON/OFF
17		U	SUB ON/OFF
16		T	R→L
15		S	R
14		R	-R
13		P	Q SET
12	L→R	N	L
11	Q DUAL/x2	M	MONO/STEREO
10		L	MULTI
9	ｲﾝﾀｰﾛｯｸ +5V	K	ｲﾝﾀｰﾛｯｸ SUB
8	ｲﾝﾀｰﾛｯｸ MAIN	J	ｲﾝﾀｰﾛｯｸ L-R
7	ｲﾝﾀｰﾛｯｸ R	H	ｲﾝﾀｰﾛｯｸ L
6	ｲﾝﾀｰﾛｯｸ L+R	F	ｲﾝﾀｰﾛｯｸ MONO
5		E	ｲﾝﾀｰﾛｯｸ GND
4		D	
3	+15V	C	+15V
2	+5V	B	+5V
1	GND	A	GND

} INTAR

IC INDEX

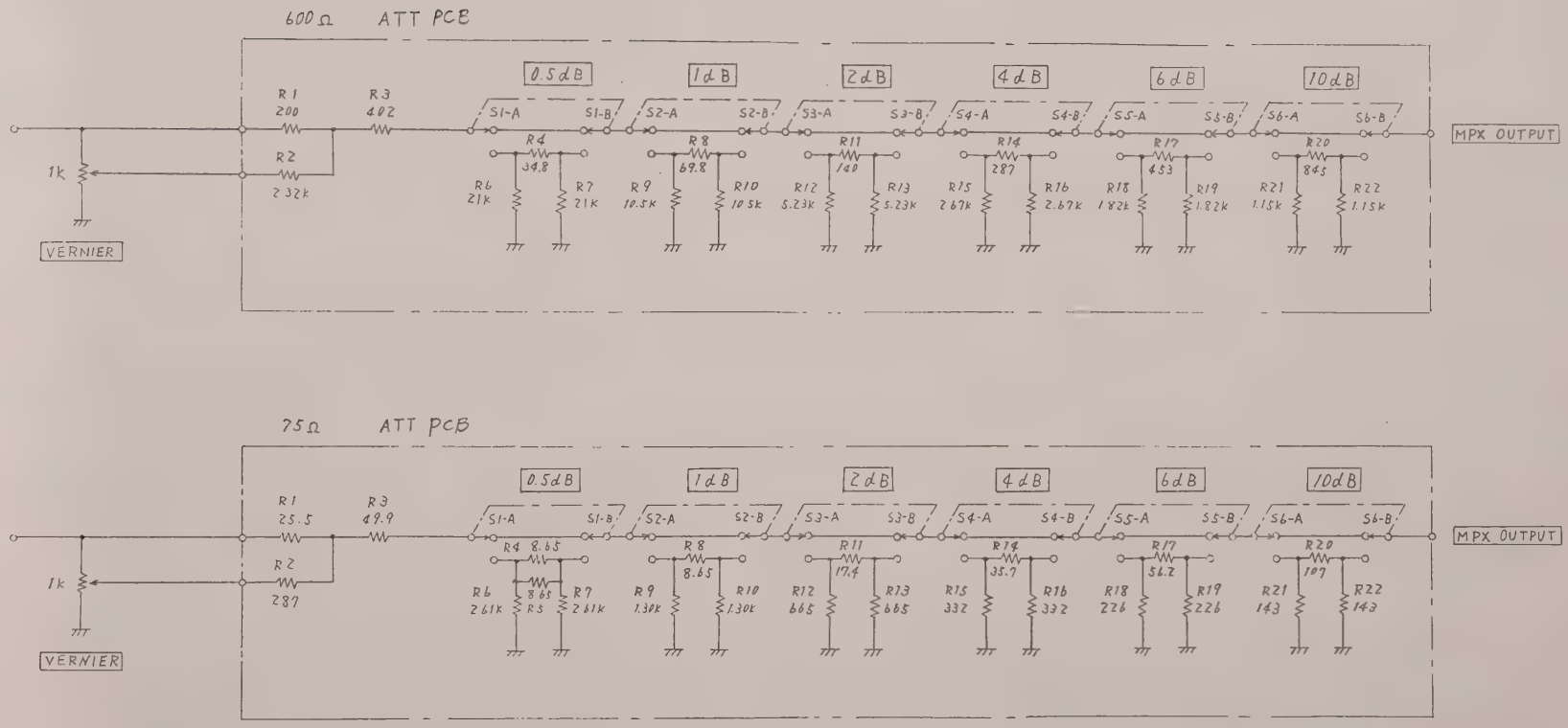
- U801, U802, U807, U808, U809, SN74LS11
- U803, SN74LS123
- U804, U805, U810, U811 U819, SN74LS00
- U806 SN74LS04
- U812 SN74LS10
- U813 SN74LS20
- U814, U815, U816, U817 SN74LS01
- U808 SN74LS08
- U820 SN74LS240

A8 MATRIX

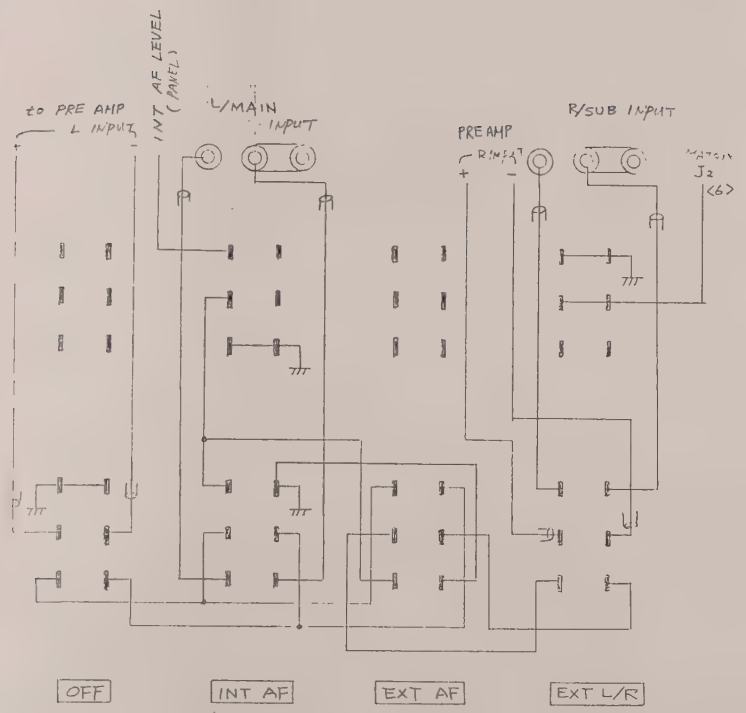


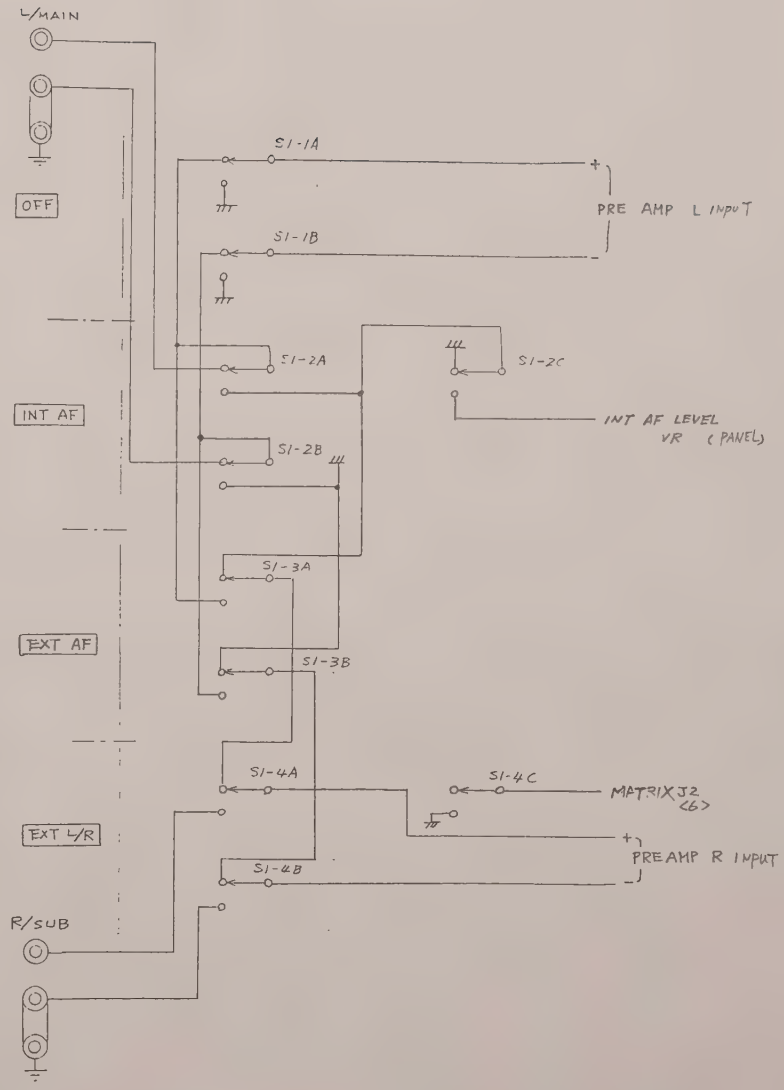
1	GND
2	+5V
3	+15V
4	SYNC UNLOCK
5	EXT SYNC IN PUT
6	GND
7	Q FREQ VARIA
8	" " ±0.2%
9	110K OUT
10	Q FREQ ±0.2%
11	
12	55.07K OUT
13	GND
14	Q STE MATRIX
15	Q DUAL/x2 MATRIX
16	SYNC OUT (15.734K)
17	
18	SUB ON/OFF
19	Q ON/OFF
20	-15V
21	
22	GND

A9 AM/SYNC

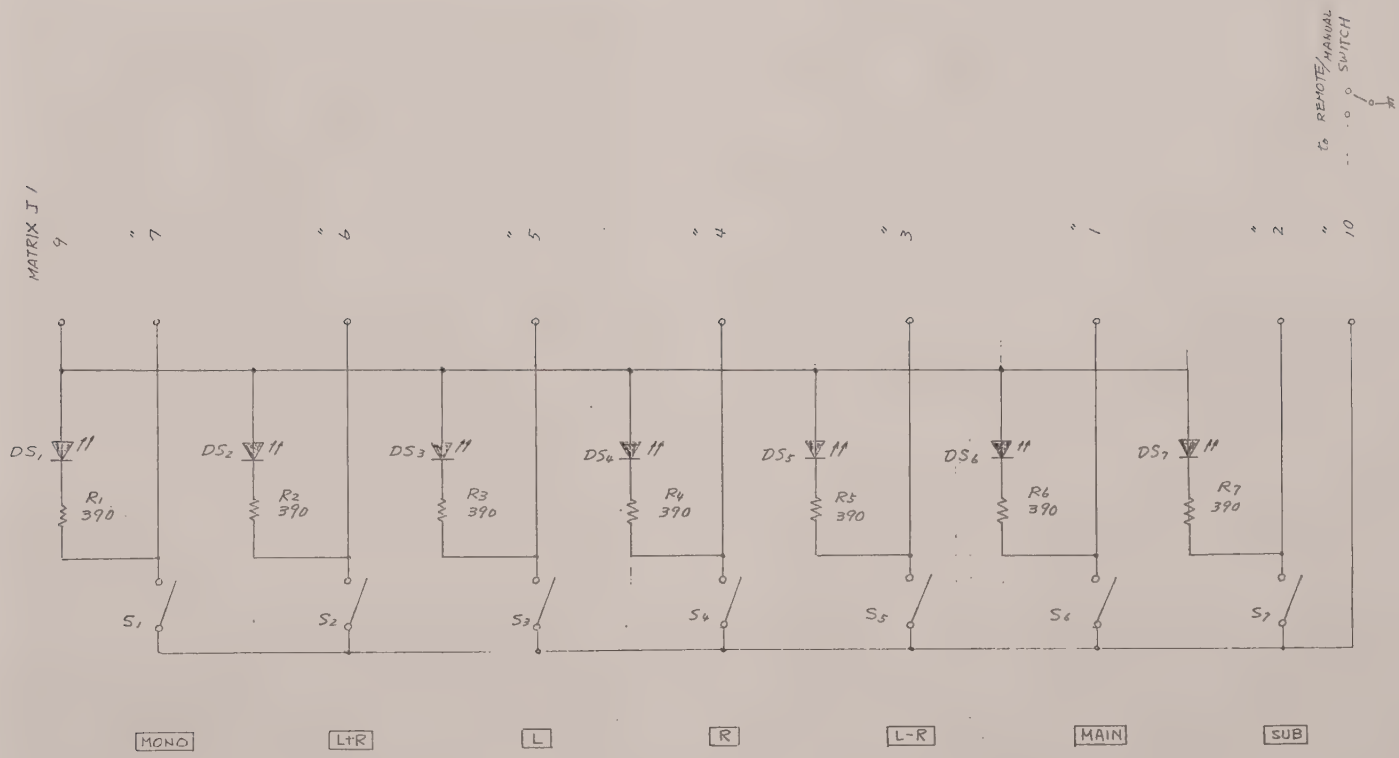


A10 ATTENUATOR



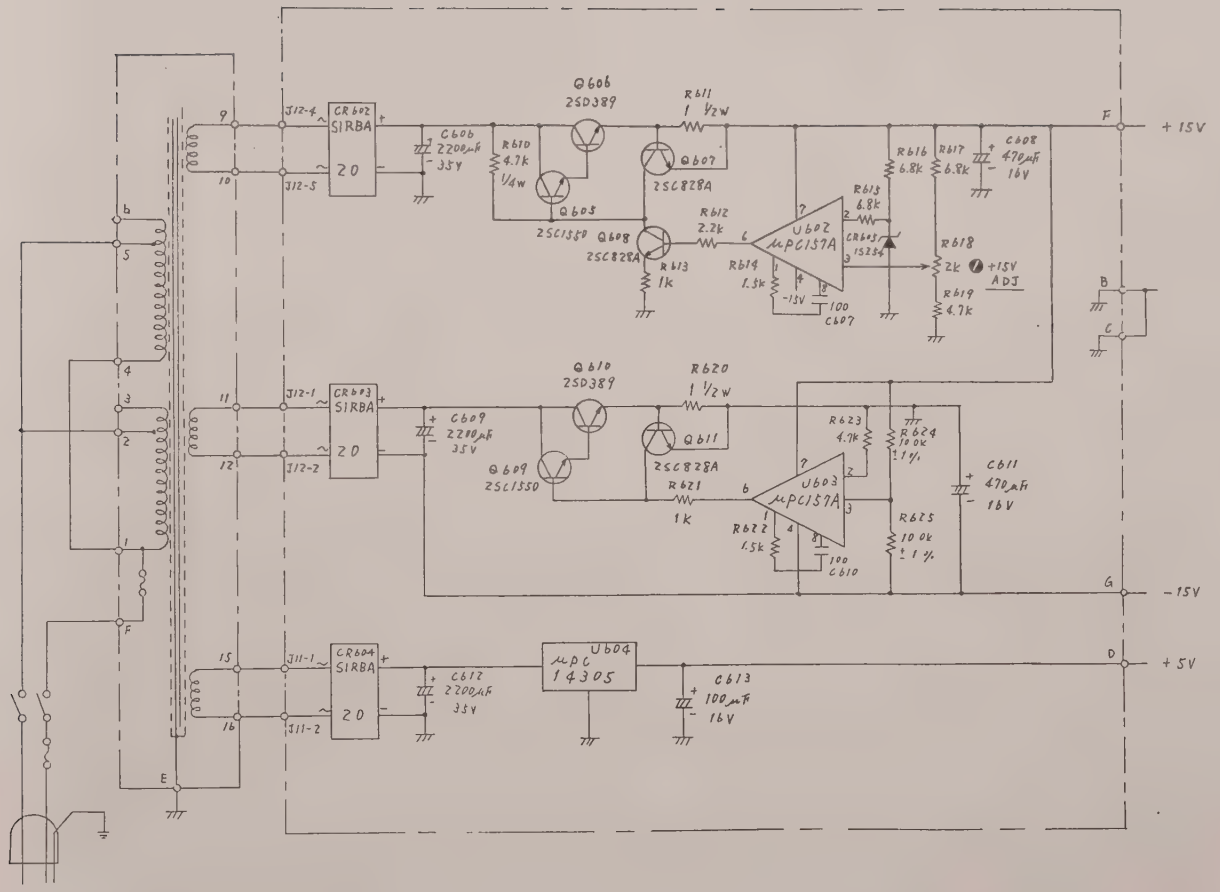


All INPUT SELECTOR

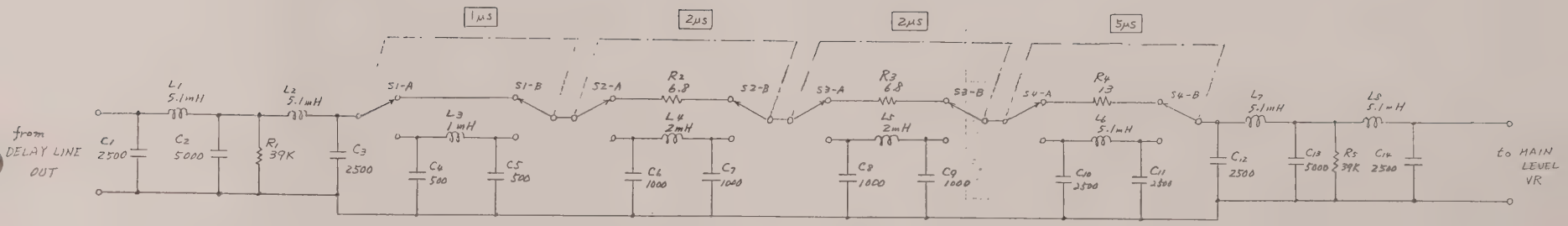


S1, DS1 ···· S7, DS7 are assembled switch in LED.

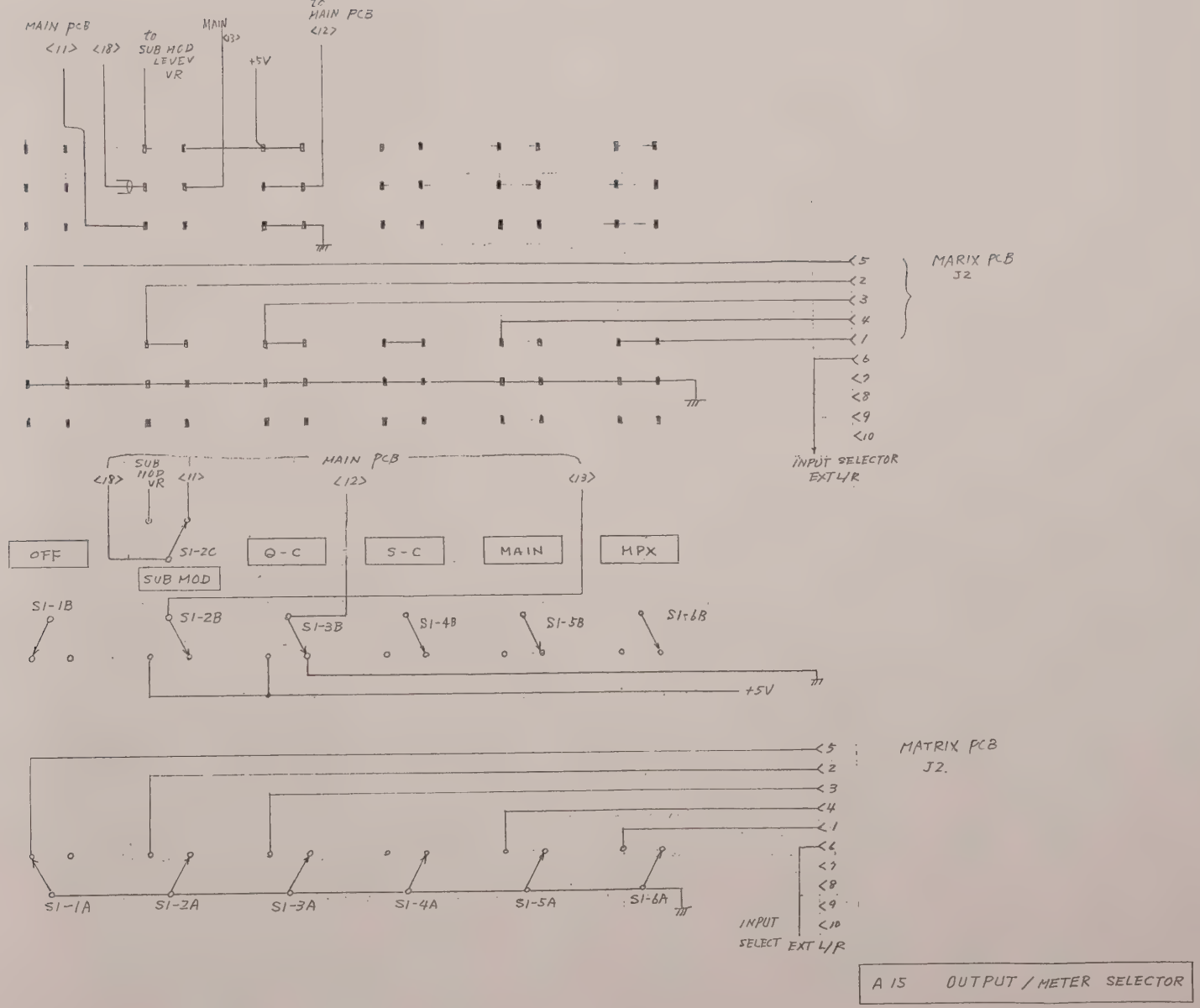
A12 MODE SWITCH



A13 POWER SUPPLY



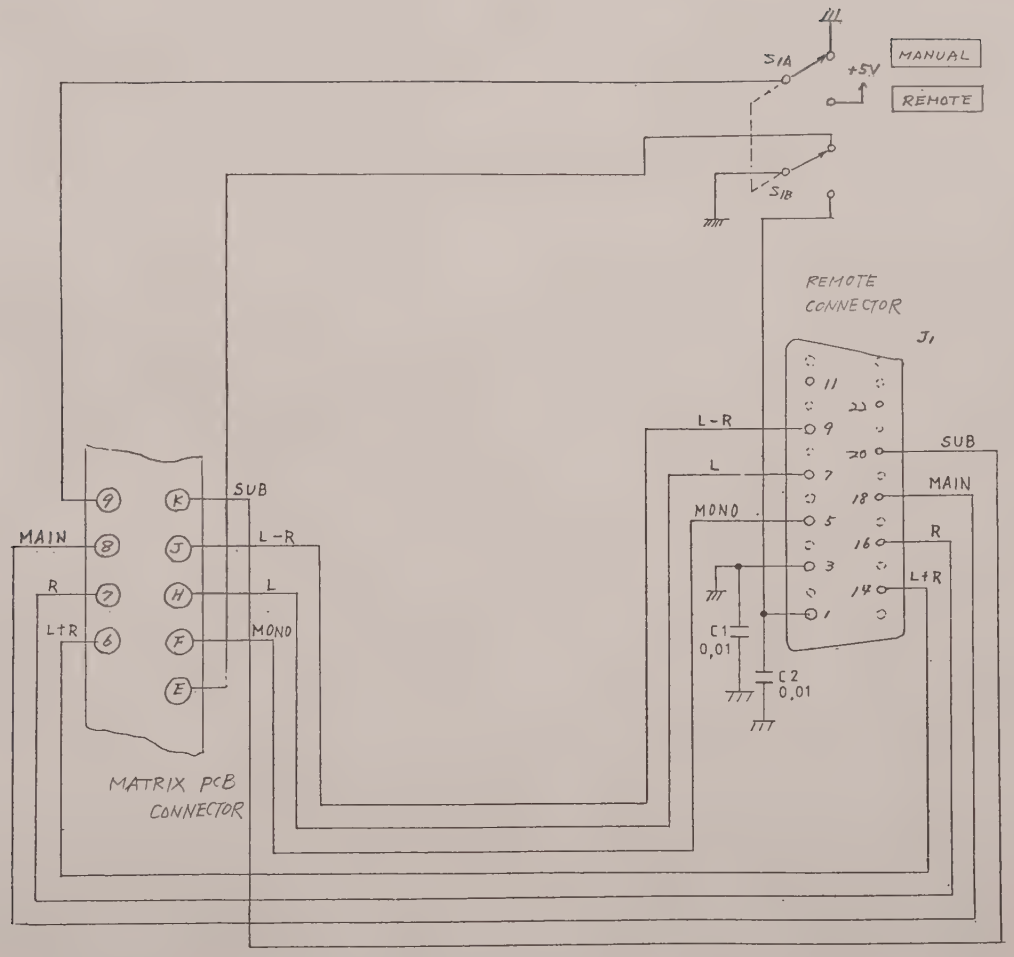
A 14 DELAY EQUALIZER



A 15 OUTPUT / METER SELECTOR

VP-7681B

3G-13-03



A16 REMOTE CONTROL

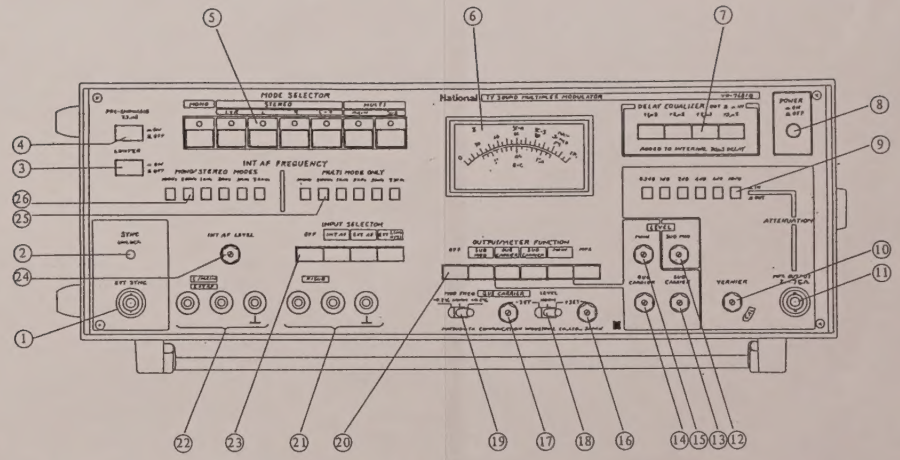
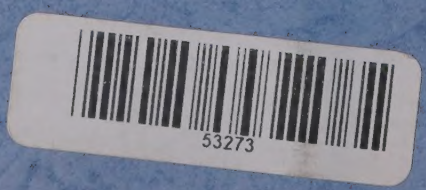


Fig. 1 Front Panel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